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TURNOVER OF JUNIOR ARMY OFFICERS:
A TEST OF THE MOBLEY, GRIFFETH, HAND AND MEGLINO MODEL OF PERSONNEL TURNOVER, USING STRUCTURAL EQUATION TECHNIQUES

by
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Turnover of Junior Army Officers: A Test of the Mobley, Griffeth, Hand and Meglino Model of Personnel Turnover, Using Structural Equation Techniques

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ABSTRACT

This thesis attempted a test of the Mobley, Griffeth, Hand and Meglino model of personnel turnover, using structural equation techniques, on a sample of junior, Army officers. Procedural, data and, possibly, model specification problems, resulted in the failure of the initial model. Following simplification, the model was run on the whole sample, Academy, OCS/OTE, ROTC(S), and ROTC(R) method of entry groups, married and single groups, a short term turnover group, and a group unconstrained by initial service obligations. Differences in causal relationships were found for the separate groups, suggesting that specific models of turnover may be appropriate for individual groups. Intended remaining service was found to be more strongly related to turnover in the short term than the long term. Initial obligations were found to have a confounding effect on the model and should be controlled for in future studies. Recommendations for further tests of the Mobley, Griffeth, Hand and Meglino model, using more appropriate analytic procedures and a more suitable sample, were made.

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I. INTRODUCTION

A. GENERAL

While there has been considerable research in the general area of turnover, the development and testing of models of personnel turnover has lagged. Early research concentrated on the identification of correlates of turnover and more recently multivariate studies, generally employing a subset of those correlates, have been reported. Several comprehensive models have been developed but testing of those models has not followed. This is probably not surprising given the large number of variables involved and complexity of their interaction. In general, the tests of the models that have been conducted, have been on simplified versions, using a restricted set of exogenous variables. The difficulty with such restrictions of the models is that it adds little to our understanding of the causal process that leads to a person leaving an organization. In general, the variables that have been selected for testing are the ones that are already known to be strongly linked with turnover. While such research does expand our knowledge of the relationships between these well-researched variables, it does little to add to the predictive capacity of such models. The small percentage of the variance accounted for in much of the research, indicates that a much broader net

should be cast. New variables and new processes need to be tested if there is to be any advance in the area. Models have been formulated and await comprehensive tests.

This thesis will test the Mobley, Griffeth, Hand and Meglino model of personnel turnover, for a sample of junior, Army officers. Data from the 1985 DOD Survey of Officer and Enlisted Personnel was sequentially matched with the Defense Manpower Data Center (DMDC) Personnel Master File and the Loss File. In this way data in the information and attitudes survey was linked with subsequent turnover behavior of individuals. Although data for all the variables specified by the model were not available, a wider range of variables than has previously been tested, was incorporated into a version of the model, revised so as to reflect the peculiar military employment situation.

B. METHODOLOGY

Variables measured in the DOD Survey were matched with the variables specified in the Mobley, Griffeth, Hand and Meglino model. Matched variables were then organized as indicated by the model (with some minor changes to account for the military employment situation). Latent variable structural equation methods, using LISREL V, were used to test the model and to revise it.

C. ORGANIZATION OF THE STUDY

The literature review is presented in Chapter II. The history of turnover research is traced through the early research on correlates of turnover, through to the development and testing of turnover models. Most of this research has been conducted on civilian populations, however a considerable body of military research is also available and this is discussed.

Chapter III discusses the Mobley, Griffeth, Hand and Meglino model and outlines the development of the model for testing. Each of the candidate variables is discussed.

Chapter IV outlines the analytic method and the results of the data analysis are presented. Separate analyses were performed for the whole sample, and the married, single, Academy OCS/OTE, ROTC(R), and ROTC(S) subgroups. To test the effects of initial obligation on turnover, the model was also run on a subgroup unconstrained by initial obligations. Finally, to test the effects of the length of the period between measurement with the survey and actual turnover, a comparison was made between turnover up until December 1985 and turnover up until September 1987.

The results are discussed in Chapter V and implications for the model are drawn. An assessment of the predictive ability of the model is made.

Chapter VI discusses the implications of the study and makes recommendations for further study.

II. LITERATURE REVIEW

A. CORRELATES OF TURNOVER

Personnel turnover has generated a significant body of research and has been the subject of several major review articles in the last two decades. Much of the early research was concerned with identifying the correlates of turnover, either with bivariate studies, or later, multivariate designs.

Porter and Steers [Ref. 1] briefly summarized previous reviews and examined in detail the research conducted in the decade leading up to the early 1970's. They noted that correlational studies abounded, with considerable evidence that job satisfaction was inversely related to turnover. Reasoning that simply knowing that job satisfaction was correlated with turnover did not say anything about why an employee was dissatisfied, they classified the contributing factors to job satisfaction into four general areas--organization-wide factors, immediate work environment factors, job related factors, and personal factors. Their classification is shown in Table 1.

Amongst the organization-wide factors discussed, pay and promotion considerations were the most consistently related to turnover. In particular, met expectations and perceived equity in pay and promotion were seen to interact with

TABLE 1

CORRELATES OF JOB SATISFACTION SHOWING SIGN OF EFFECT

1. Organization Wide Factors

   Pay and promotion (-)
   Perceived inequity of pay and promotion (+)
   Met expectations (-)
   Organizational size (?)

2. Immediate Work Environment Factors

   Satisfaction with Supervisory style (-)
   Size of working unit (+)
   Co-worker satisfaction (+)

3. Job Content Factors

   Satisfaction with job content (-)
   Task repetitiveness (+)
   Job autonomy and responsibility (-)

4. Personal Factors

   Age (-)
   Tenure (-)
   Congruence of job and vocational interests (-)
   Extreme personality characteristics (+)
   Family size (+ for women, ? for men)
   Family responsibility (+ for women, ? for men)

Source: Porter and Steers [Ref. 1]

actual pay and promotion rate, leading to feelings of satisfaction or dissatisfaction.

Three work environment factors were identified. Met expectations of supervisory style, work unit size (for blue but not white collar workers), and co-worker satisfaction, all had been shown to be negatively related to turnover.

Turnover was seen to be positively correlated with the job related factors, task repetitiveness and perceived lack

of job autonomy and responsibility. Role clarity was seen to affect satisfaction in two ways. First, realistic job knowledge could screen out, at the employment stage, those who would not be satisfied with the tasks and rewards of the job. Second, accurate role perceptions should act to increase the congruence between actual task and expectations, leading to an increase in satisfaction.

Several personal factors have been shown to relate to turnover. Age and tenure are negatively related to turnover. Family size and family responsibilities (for males but not for females) have also been shown to be negatively related but the research has provided some contradictory evidence. Similarity of vocational interests and job, was shown to be positively related to turnover.

Commenting on methodological problems with the research reviewed, Porter and Steers noted the necessity to employ predictive designs, control groups, longitudinal designs, and the need to distinguish between avoidable and unavoidable turnover. To a large extent, these methodological issues have been addressed in subsequent research. They also pointed to the need to provide a conceptual framework for turnover research and suggested that met expectations might provide the basis for that. They proposed that met expectations could be conceived of as the difference between initial expectations and what was

actually encountered on the job. The lower the level of met expectations the higher would be the propensity to leave.

Finally, Porter and Steers suggested that future research should give greater emphasis to the psychological process of withdrawal, initial expectations and the way they are met and change over time, the differential value of employees to the organization, and the effects of organizational intervention on subsequent turnover.

Mobley, Griffeth, Hand, and Meglino [Ref. 2] echoed Porter and Steers call for a more rigorous approach to the study of turnover. In addition to reviewing the relevant research, they attempted to clarify the distinctions between many of the constructs that had been proposed as precursors of turnover and proposed a conceptual model of the turnover process.

Mobley, Griffeth, Hand, and Meglino divided their research summary into seven groups; individual demographic and personal factors, overall satisfaction, organizational and work environment factors, job content factors, external environment factors, recently developed constructs, and multivariate studies.

The individual demographic and personal factors they found to be consistently negatively related to turnover were age and tenure. Other factors found to have inconclusive links were sex, family responsibilities, education, and weighted application blanks. Overall job satisfaction was

found to be consistently negatively related to turnover, though when it was included in multivariate studies its effect was frequently found to be non-significant.

The evidence for the effects of organizational and work environment was found to be inconsistent. Studies on satisfaction with pay, promotion, size, and peer group relations, produced a variety of results with no clear picture emerging. Though there was also some inconsistency in the research on satisfaction with supervision, it was argued that the general tendency was for a negative relationship with turnover.

Of the job content factors, satisfaction with the work itself, the perceived intrinsic value of the work, intrinsic motivation and intrinsic satisfaction were all found to be negatively related to turnover.

The role of external environment is unclear. At the aggregate level turnover was found to be related to several economic indicators, such as the unemployment rate, and job vacancy rate. At the individual level, perception of alternative employment, though theoretically important, had not been sufficiently researched to allow any firm conclusion. Similarly, though there were some indications of differences between blue and white collar workers, managers and non-managers, government and non-government workers, and higher professionals, the role of employment groupings was inadequately researched.

In the years between the Porter and Steers review and the Mobley, Griffeth, Hand, and Meglino review, several new variables and constructs had been investigated. These included behavioral intentions, organizational commitment, realistic expectations and centrality of work values.

Behavioral intentions had been studied as a link between affective variables (such as job satisfaction) and turnover behavior. It consistently displayed a positive relationship with turnover, and generally accounted for a larger proportion of variance than did job satisfaction.

Other affective variables (organizational commitment and attachment) also had shown promise as predictors of turnover, generally accounting for a larger proportion of the variance than satisfaction. However their complexity as constructs and the inclusion of intentions in their operational definitions, indicated that further research was necessary.

The Porter and Steers suggestion that met expectations could be used to form a conceptual basis for turnover research had led to the investigation of the concept. Mobley, Griffeth, Hand, and Meglino commented that, although it was likely that met expectations was an important antecedent of the affective variables, a more complex conceptualization than that suggested by Porter and Steers was necessary.

In their review of the multivariate studies, Mobley, Griffeth, Hand, and Meglino found that these accounted for a greater proportion of the variance than single variables. They concluded that a great deal of variance remained to be accounted for and further development of multivariate models was desirable. They noted that other than linear models may be appropriate and that interaction terms should also be studied.

Echoing Porter and Steers concern to distinguish between voluntary and involuntary turnover, Mobley, Griffeth, Hand, and Meglino also noted that more precise definitions of turnover were required and that different researchers were apt to include different kinds of turnover in their criterion. They also noted that the time period over which the data were collected contributed to the criterion problem and that the effects of different lengths of time between the collection of the explanatory and dependent variables had not been studied frequently.

Cotton and Tuttle [Ref. 3] conducted a review and meta-analysis of the literature, to summarize the findings and resolve some of the contradictory evidence. They used two procedures to arrive at their measures of reliability, the counting method and adding Zs. The first method, the number of studies which find a variable is a significant correlate of behavior, is compared to the number of studies that find no relationship or a relationship with the opposite sign.

Adding Zs involves the transformation of p values into Z values, summing them and dividing by the square root of the number of studies. The result is compared to the standard normal distribution. Their results are shown in Table 2, which indicates the reliability and direction of effect (positive = +, negative = -) of the variables they included. Although the p values they associated with the reliability of the variables seems very conservative by usual standards (e.g., they place only weak to moderate confidence in a p value that lies between .01 and .05), they deliberately set them that way to compensate for the file draw effect, where predominantly significant studies are the ones reported. They found substantial agreement with previous, non-quantitative reviews and listed a large number of variables that have shown a stable relationship with turnover; among them pay, overall job satisfaction, satisfaction with the work itself, pay satisfaction, age, tenure, education, number of dependents, met expectations and behavioral intentions. Intelligence, accession rate, and task repetitiveness had little or no stable relationship with turnover. In between, showing some relationship, were variables such as unemployment rate (for aggregate turnover but not individual), job performance, satisfaction with co-workers, satisfaction with promotional opportunities, and marital status.

TABLE 2

SUMMARY OF TURNOVER CORRELATES BY CONFIDENCE AND EFFECT
(Adapted from Cotton and Tuttle [Ref. 4:pp. 61, 64]

Strong Confidence ($p<.0005$)	Moderate Confidence ($p<.005$)	Weak to Moderate Confidence ($p<.01$)	Weak Confidence ($p<.05$)	No Confidence ($p>.05$)
Employment perceptions +	Unemployment rate -	Marital status -(married)	Accession rate +	Intelligence +
Union -(present)	Job performance -	Aptitudes and abilities	Task repetitiveness +	
Pay -	Sat'n with co-workers -			
Overall job sat'n -	Sat'n with promotional opportunity -			
Sat'n with work itself -	Role clarity -			
Pay sat'n -				
Sat'n with supervision -				
Age -				
Tenure -				
Gender +(women)				
Education +				
Number of dependents -				
Biographical info.				
Organizational commitment -				
Met expectations -				
Behavioral intentions +				

From their analysis Cotton and Tuttle also concluded that many of the variables are linked to turnover through other variables acting as moderators. They recommended that further research into the relationships between variables was necessary and that additional variables, such as organizational size, job characteristics and organizational structure, be considered.

B. MODELS OF TURNOVER

A consistent call from reviewers and researchers of the turnover process for the last two decades, has been for the development of comprehensive models of the turnover process. Although other models predated it (e.g., Rice and Trist [Ref. 4], March and Simon [Ref. 5], and Porter and Steers [Ref. 2]), the first in the current class of turnover models was introduced by Price [Ref. 6].

Price conceived job satisfaction as the determinant of turnover, but introduced a series of structural and individual antecedents to satisfaction. These were pay, centralization, communication, and participation in primary groups. Price hypothesized that the independent effects of demographic characteristics, such as age, tenure, and education would be eliminated by the introduction of these variables. Price also suggested that the state of the economy (opportunity structure) would interact with satisfaction in determining the turnover decision.

Bluedorn [Ref. 7:p. 136] summarizing the empiric .l tests of Price's model, reported that the interaction between satisfaction and opportunity structure was not demonstrated, and that opportunity appeared to be an antecedent to satisfaction. The demographic variables were also shown to maintain a direct effect on turnover.

Mobley [Ref. 8] proposed a model of the turnover decision process, which set out the linkages between job satisfaction and turnover. His variables were, evaluation of existing job, job satisfaction, thoughts about quitting, evaluation of expected utility of search and costs of quitting, intention to search, search, evaluation of alternatives, comparison of alternatives and present job, intention to quit, and finally turnover. Mobley predicted that job attitudes should be directly related to thoughts about quitting and only indirectly, through those cognitions, to turnover. He further predicted that the best predictor of turnover should be intention to quit.

Mobley, Horner and Hollingsworth [Ref. 9] simplified the model, proposing the following linkages; (1) individual characteristics, probability of finding alternate employment, and job satisfaction lead to thoughts of quitting, (2) thoughts about quitting lead to intention to search, (3) probability of finding an acceptable alternative leads to intention to search, (4) intention to search leads to intention to quit, and (5) intention to quit leads to

turnover. In an empirical test of the model, Mobley, Horner and Hollingsworth found that it was supported, but that some of the proposed paths were not as the model predicted. Probability of finding an acceptable alternative was a precursor of thinking about quitting, but not intention to search or intention to quit. Job satisfaction was a precursor of intention to search but had no direct effect on intention to quit.

Dalessio, Silverman and Schuck [Ref. 10] reviewing the research on the model, noted that some empirical support was forthcoming, but that departures from the original model were evident. A general finding was that job satisfaction had an effect on turnover only through withdrawal cognitions (intention to quit, intention to search, and thinking of quitting). However, many of the paths proposed in the original model were not consistently supported.

Dalessio, Silverman and Schuck conducted a path analysis, using the data from five of the previous tests of the model. The resulting model exhibited paths from; (1) age to thinking of quitting and job satisfaction, (2) job satisfaction to thinking of quitting and intention to quit, (3) thinking of quitting to intention to search and intention to quit, (4) intention to search to intention to quit, and (5) intention to quit to turnover. They noted that the path age, job satisfaction, thinking of quitting, intention to search, intention to quit, turnover was

consistently found in the research they reviewed, even though the populations studied and many of the measures used were not the same. They therefore concluded that this path was quite robust. Despite this they also found that the path coefficients varied considerably between studies. Three possible reasons for this were advanced.

First, it is possible that a single model of turnover is not appropriate for different occupations. Second, omitted variables may be producing unreliable estimates of the path coefficients. Third, data measurement problems could also be contributing to unreliable path coefficients. In particular, single item measures with unknown reliability and convergent validity problems with the different items that were used to measure the same theoretical constructs, were considered to be likely suspects. Another possibility was that multicollinearity problems were resulting from variables, such as age and tenure, which may be measuring a single underlying construct. A final possible contributor to the differing path coefficients is the different turnover periods used in the studies. Steel and Ovalle [Ref. 11], have shown that as the time between measured intention and turnover lengthens, the relationship between the variables weakens. Dalessio, Silverman and Schuck suggested that the effects of the turnover period on the relationship between turnover and other variables needs to be researched.

Mobley, Griffeth, Hand and Meglino [Ref. 2] introduced a more comprehensive model of the turnover process as an extension of the Mobley [Ref. 8] model. This model was developed, in part, from the material covered in their comprehensive review and accounted for a wider range of factors than the Mobley [Ref. 8] model. The immediate precursor to turnover was intention to quit, but this relationship could be attenuated by impulsive behavior. It was hypothesized that the more specific the intention, and the closer together intention and behavior, the stronger would be the link.

The determinants of intention were satisfaction, attraction-expected utility of present job, and attraction-expected utility of alternatives. These variables were moderated by centrality of work values relative to other life values and interests, beliefs regarding the non-work consequences of quitting/staying, and contractual constraints. The antecedents of satisfaction and the two attraction variables were individual personal (age, tenure, education, interests, personality, socio-economic, family responsibility, and aptitude), and individual occupational (hierarchical level, skill level, status, and professionalism), organizational (goals-values, policies, practices, rewards, job content, supervision, work group, conditions, and climate), and economic-labor market

conditions (unemployment, vacancy rates, advertising levels, recruiting levels, and word of mouth communication).

The Mobley, Griffeth, Hand and Meglino model is very complex and difficult to capture in a single research effort. Probably as a consequence of this it has not received a great deal of research attention. Michaels and Spector [Ref. 12] tested an abbreviated version of the model, including only age, tenure, salary, job level, task characteristics, consideration behavior by supervisor, job satisfaction, perceived alternative employment opportunities, intention to quit and turnover. They also included two variables not considered by Mobley, Griffeth, Hand and Meglino; confirmed pre-employment expectancies and organizational commitment. Michaels and Spector used path analysis and obtained results that were generally supportive of the model and confirmed that pre-employment expectancies contributed to job satisfaction and that organizational commitment, as well as job satisfaction was an antecedent to intention to quit. Some exceptions were noted. Salary level, job level and tenure were not related to any of the other variables, and perceived employment opportunities did not contribute to intention to quit, nor did it act as a moderator to intention to quit or job satisfaction.

Bluedorn [Ref. 13] proposed a simple model of turnover from the military. Organizational structure variables (pay and organizational control) and environmental variables

(push [the degree to which the individual will be sanctioned if he does not join], and pull [the number and quality of unoccupied role in the organizations environment]), act through job satisfaction to determine turnover. A path analysis revealed that the model was supported but in addition pay, environmental push and environmental pull, all had direct effects on turnover. This model has received very little attention in either the civilian or military literature. Perhaps this is because of its relative simplicity or perhaps because it was developed using pre-Vietnam, draft era data, which is not seen as relevant to either civilian work conditions or current era military recruiting.

Bluedorn [Ref. 7] proposed a further model integrating the models of Price [Ref. 6], Mobley [Ref. 8] and the work conducted on the effects of organizational commitment. Conducting a path analysis, Bluedorn found that instrumental information, equity and age were antecedents of job satisfaction; job satisfaction, equity, age, potential role conflict, promotion opportunities, routinization and education were antecedents of organizational commitment; foregone environmental opportunities and environmental opportunities preceded job search; organizational commitment and job search preceded intent to leave; intent to leave, age, routinization and environmental opportunities were the precursors of turnover.

Again, this model has received very little attention from other researchers, though it does have some appealing features. The role conflict variable, for example, is based on a question asking if the respondent would quit the company if asked to do so by a spouse. This notion that significant others are involved in the decision process is one not taken up in many models. As will be discussed later, it has particular significance in the military situation.

Steers and Mowday [Ref. 15] developed a comprehensive model of turnover behavior, based on their review of the literature. Their variable sequence was; job expectations and values lead to affective responses (job satisfaction, organizational commitment, and job involvement); affective responses lead to desire/intent to leave, moderated by non-work influences; intention to leave leads to turnover, moderated by alternative job opportunities. The affective responses are influenced by three feedback loops through organizational characteristics and experience, job performance level, and efforts to change the situation. Another feedback loop runs from desire/intent to leave, through search for preferable altern tives, to alternative job opportunities, and in turn to job expectations. Job expectations and values is also influenced by available information about the job and organization, and by economic and market conditions through alternative job opportunities.

Job expectations is also influenced by individual characteristics, both directly and indirectly, through alternative job opportunities.

Steers and Mowday's model has also received very little attention from other researchers, the only major empirical test being conducted by Lee and Mowday [Ref. 16]. They found substantial support for the model but that some of the hypothesized variables did not add significantly to the explained criterion variance. The following links were confirmed; available information about job and organization to met expectations and job values; met expectations, job values, organizational characteristics, organizational experiences, and job performance, to affective responses; and, affective responses to intention to leave. There was no significant effect for the following links; alternative job opportunities to met expectations and job values; alternative job opportunities to turnover, either directly or through intention to leave; individual characteristics to met expectations; efforts to change a situation to affective responses; and, non-work influences to intention to leave.

Lee and Mowday noted that, despite the apparent comprehensiveness of their model, only five percent of the variance in turnover could be accounted for and that this was slightly less than other comprehensive models have been able to account for. This last claim is somewhat hard to support, as other researchers have reported far higher

variance accounted for. Michaels and Spector [Ref. 12] reported 22 percent; Mowday, Koberg and McArthur [Ref. 17] reported 12 percent and 20 percent (although this study has been criticized for exhibiting severe multicollinearity (Dalessio, Silverman and Schuck [Ref. 10:p. 252])); Arnold and Feldman [Ref. 18] reported nine percent; and, Bluedorn [Ref. 14] reported 11 percent. The small variance accounted for in the Lee and Mowday paper could arise from a number of causes. First poor measurement of the exogenous variables may have been a contributor. Some one and two item measures of unknown reliability were used, however most endogenous variables, and especially those along the paths that were confirmed, were measured with instruments of known validity and reliability. The two items used to measure intention to leave were not reported, however the correlation between their average and leaving (.24) suggests that they were not particularly strong measures of intention to leave. Restriction of range of the population is another possibility for poor prediction, though this is unlikely given the size and breadth of their sample. Poor measurement of the endogenous variable could also be the cause. Lee and Mowday do not report their method of classifying turnover, so it is difficult to make a judgment on this. Finally, a poorly specified model may be the reason for such poor prediction. This too seems unlikely, as the model uses as a base a similar path from individual

characteristics, to affective responses, to intention to leave, to turnover, that characterizes the bulk of the turnover models researched. Predictably, it is this path that is largely confirmed by Lee and Mowday's research.

Arnold and Feldman [Ref. 18] proposed a model in which demographic variables, tenure, cognitive/affective orientation to the position, and perceived job security, acted through intention to search and consequently intention to turnover, to affect turnover. Perceived existence of alternatives acted on intention to turnover, either directly or indirectly through intention to search. Their test of the model led them to modify it, so that age, job satisfaction, and organizational commitment lead to intention to search, and tenure intention to search and perceived job security lead to turnover. Like Lee and Mowday [Ref. 16], they found no evidence of an interaction between intention to leave and perceived alternatives.

Youngblood, Mobley and Meglino [Ref. 19] conducted a study of particular interest because of its longitudinal design. They studied a group of enlistees into the U.S. Marine Corps and took repeated measures over a four year period. They used the variables expected utility of the present military roles, expected utility of alternative civilian roles, net expected utility, satisfaction, behavioral intention to complete the enlistment, and behavioral intention to re-enlist. The results indicated

that the satisfaction and behavioral intention variables distinguished between stayers and leavers and that they changed systematically over time. The behavioral intention variables were seen to be lowest and decline in the period immediately before leaving. The expected utility of alternatives construct was not supported.

Williams and Hazer [Ref. 20] examined the relationship of job satisfaction and organizational commitment. Although these variables had been used in several models and had been shown to be antecedents of turnover, Williams and Hazer argued that the relationship between them was that job satisfaction is an antecedent to organizational commitment. They demonstrated, in a reanalysis of Michaels and Spector's [Ref. 12] and Bluedorn's [Ref. 14] data, that equity, routinization, instrumental information, and age were precursors of job satisfaction, which in turn lead to organizational commitment, then intent to leave, and finally to turnover. The Williams and Hazer study is potentially flawed, however, because they failed to take heed of earlier warnings on the relationship between organizational commitment and turnover. Koch and Steers [Ref. 21] in their examination of the relationship of job attachment, a closely related construct to organizational commitment, pointed out that it should have a stronger relationship to turnover than satisfaction because it includes an intention to leave component. Mobley, Griffeth, Hand and Meglino [Ref. 2:p.

21] echo the concern, that it is the inclusion of an intention to leave component in organizational commitment that could be responsible for its stronger relationship with turnover.

C. MILITARY RETENTION RESEARCH

Military occupations have many unique features that are not frequently experienced in the civilian world. Probably more than most occupations, the military employee's family is affected by his employment. Military members are subject to frequent moves which can be very disruptive to family life. Children's education and social development can be affected, spouse' employment may be disrupted, military housing is frequently below standard, and extended family and friendship links are broken. Other aspects of military life which may affect employment decisions, are the requirement to be away from home frequently, obligated service, living in the field, long working hours and weekend work with no direct affect on take home pay, danger, military discipline and loss of constitutional rights, and the requirement to lay down your life should the situation demand it. All of these factors have potential to influence the quit/stay decisions of military personnel and should, if possible, be taken into consideration in the development of models of military turnover behavior.

Since the inception of the All Volunteer Force (AVF), the military has been vitally concerned with its retention

rates. Considerable research has been conducted in the area but with the majority of the emphasis placed on the retention of enlisted personnel. The research conducted on officer turnover has been relatively limited and very few models of the officer turnover process exist.

The Rand Corporation has developed a related series of models (PVCOL, PPM, ACOL, and the Dynamic Retention Model), whose purpose has been to analyze the incentive effects of different compensation packages on Stay/leave decisions. Argüden [Ref. 22] summarized the development of these models. An example of the application of this type of model is given in Gotz and McCall [Ref. 23]. They developed a dynamic programming model (the Dynamic Retirement Model) which took into account promotional probabilities and timing, regular force integration probabilities, and mandatory separation probabilities to predict the retention of U.S. Air Force officers under different retirement benefit policies. This aggregate, dynamic programming approach is quite distinct from the individual, multivariate strategies employed in the previously discussed research but has some relevance, because it indicates the importance of pecuniary and organizational factors in the military turnover decision.

Dudley and Hoyle [Ref. 24] surveyed Army and Marine Corps officers to determine their attitudes to a set of career rewards and determine the relationship between those

attitudes and retention decisions. They found that of the career rewards held to be important, intrinsic career rewards (trusted by subordinates and superiors, interesting job, respected by superiors, responsibility and authority, pride in self, supportive atmosphere, exciting job, accomplishment, etc.) were more highly valued than extrinsic rewards (financial security, job security, pay, promotion, and fringe benefits), but the perceived probability that those intrinsic rewards would be received was low. All of the career rewards held to be important were highly correlated with stated turnover intent.

Jacobson [Ref. 25] suggested that the reduction in family earning power due to permanent change of station (PCS) moves, should have a similar effect on turnover to an equivalent pay reduction for the military member. Smith and Goon [Ref. 26] investigated the effects of spouse employment on Air force officer retention. They estimated two equations. The first estimated a spouse labor supply model, using as variables potential market wage, reservation wage, other family income, and labor market demand at current location. The second estimated a model of retention, using year of service groups, relative grade, U.S.A.F. occupation, education, CONUS assignment, spouse employment status, and demographics. Smith and Goon found a small (non-significant), negative relationship between spouse labor force participation and retention. They also found that

spouse employment effects were more negative for younger officers. This second finding was thought to be related to a self-selection process, with those most affected by spouse employment choosing to leave the service early in their careers. Smith and Goon argued that because they only considered the effect of women who were actually in the labor market and not that of those who would be if their husbands were not in the military, the estimated effect of participation is biased upwards. Lal [Ref. 27:p. 6], in his literature review, quoted a Government Accounting Office publication, citing increased private sector job opportunities, the widening civilian/military pay gap, threats to the retirement system, perceived erosion of benefits, the high cost of PCS moves, and working spouses, as factors in Air Force pilot retention.

The Lal study [Ref. 27] is of particular relevance to the current research because the data is drawn from the same source as is used here. Arguing that satisfaction with military life and number of years intended to serve are jointly determined, Lal developed a simultaneous equation model of quit/stay decisions of married, junior, Army officers. In the first equation intended length of service is estimated from satisfaction with military life, monetary compensation, age, race, sex, promotional potential, length of service, source of commission, probability of transfer to an undesirable location, intention to join the National

Guard or Reserve Force and time spent overseas. Though at first sight it might appear that the number of related variables might lead to problems with multicollinearity, Lal reports that there were no significant correlations between any of the explanatory variables. Lal does not provide a correlation matrix, so it is not possible to check this contention. It seems unlikely that, with a military sample, there are no correlations between age, length of service, and compensation, due to the general homogeneity of the group. The sample used in the present research exhibited very high (in the region .65 to .85) intercorrelations between age, length of service, and regular military compensation. While the two samples are not the same (the present research uses male, married and single officers, with between one and 12 years of service), it does at least cast some doubt on Lal's contention that no significant correlations exist.

A further difficulty with Lal's methodology arises from the selection of intended length of service as the dependent variable for the first equation. This variable incorporates two distinct behaviors, one historical (service already completed), the other future oriented (intention to continue to serve). It is likely that the satisfaction measures taken at any point in time are better predictors of future behavior than they are of past behavior. A more appropriate dependent variable night therefore have been intention to

continue to serve, particularly given the stated objective to "identify and understand factors that influence the decisions of junior Army officers to stay or not to stay ...." [Ref. 27:p. 14].

The second equation estimates satisfaction with military life from perception of military life, morale of military personnel at current location, opportunity to serve country, working conditions, training and education facilities, job security, chance of promotion, retirement benefits, pay and allowances, employment status of spouse, medical and recreation facilities, frequency of moves, commissary services, and general environment for family.

Variables which made a significant contribution to intended length of service were satisfaction with military life, age, years of service, sex, occupation, promotion, intention to join National Guard or Reserve Force, and undesirable location.

Variables which made a significant contribution to satisfaction with military life were intended length of service, working conditions, co-workers, morale of personnel in current location, personal freedom, job security, satisfaction with current job, chance of promotion, retirement benefits, expectation of military life, opportunity to serve country, family better of with civilian job, medical facilities, commissary services, family environment, PCS moves, and pay and allowances.

To correct for aggregation bias, Lal ran separate equations for combat arms/non combat arms, scientifically trained/military trained, sex, and source of commission. Differences were found for all groups, indicating that different groups in the Army leave for different reasons.

D. SUMMARY

Early research into employee turnover concentrated on correlates of turnover. A considerable number have been identified. Military research has indicated the need to take into account variables that are a result of the unique military lifestyle. Military employment has a profound effect on family and there is sufficient evidence to suggest that this is an important determinant of turnover.

Since the mid 1970's more effort has been spent on the development of conceptual models of the turnover process. Most of this work has concentrated on the psychological processes that lead to an individual deciding to leave but increasingly other factors are being introduced. To date, very few models have been able to account for more than approximately one fifth of the variance in turnover and this indicates the need to consider alternative constructs to try to improve the level of prediction. It may also indicate that turnover behavior is highly idiosyncratic and not a good candidate for multivariate prediction. Perhaps the "typical" leaver is atypical. Lee and Mowday [Ref. 16:p.

721] also indicate the need for more direct testing of the models so far developed.

This research will attempt to test a comprehensive model of turnover, of junior, Army officers, who enter the Army through the Academy, OCS/OTE, and ROTC schemes, incorporating as many of the known determinants of turnover as are available in the data supplied. The model developed by Mobley, Griffeth, Hand and Meglino [Ref. 2] will be modified to take into account the data available in a 1985 Department of Defence survey of military personnel [Ref. 28].

III. DEVELOPMENT OF THE MODEL

A. DATA BASE

The data for the analysis was a subset of the responses to a Department of Defence survey conducted in 1985. The 1985 DoD Survey of Officer and Enlisted Personnel (hereafter referred to as the Member Survey) was a world wide survey of 132,000 all-service, all-rank, military members. Reference 28 provides further information on the sampling methods and return rates of the survey.

The Member Survey collected information in nine topic areas:

1. Military Information; Service, pay grade, military occupation, procurement source, and remaining obligated service (for enlisted personnel only),
2. Present and Past Locations; length of stay, expected stay, and problems encountered both at the present location and in moving to it,
3. Re-Enlistment/Career Intent; expected years of service and expected pay grade on leaving,
4. Individual and Family Characteristics; sex, age, marital status on entry and when surveyed, and educational attainment,
5. Dependents; age, number, sex, relationship, and handicaps,
6. Military Compensation, Benefits and Programs; benefits received and availability of and satisfaction with Service family programs,
7. Civilian Labor Force Experience; labor force experience of household,
8. Family Resources; earnings and debts of household,

9. Military Life; attitudes to military life, including pay and allowances, interpersonal environment, and benefits.

A subset of respondents to the Member Survey was selected on the following grounds:

1. Male Army officers: Previous research has indicated that the turnover behavior of men and women can be influenced in different ways by similar circumstances (see, for example Table 2.). It was therefore decided to eliminate women from the model test.

2. Officers who have not served in the ranks: Officers who were commissioned after serving some time in the ranks were excluded. Their service experience is quite different to officers who are directly commissioned. For example, for an equivalent length of service they are more junior in rank and, having had some service experience before commissioning, they are more certain of their commitment to the Service.

3. Length of service between one and 12 years (inclusive): Officers with less than one year of service have had limited exposure to service life and are less likely to be well acculturated. For those with longer than twelve years of service, retention is motivated by a different set of factors than those with less. The attraction of retirement benefits after 20 years of service is a significant motivator for retention and its effects can be seen in the pattern of retention rates of officers around the ten year point. A typical pattern is for increasing turnover up to the ten year point, at which time there is a distinct break. Retention increases steadily up to the 12 year point, then remains relatively stable until the 20 year point is reached.[1]

4. Rank between 2nd Lieutenant and Major (inclusive): This is almost a redundant selector, in that it is very unusual for an officer, entering under the schemes selected, to have achieved a rank higher than Major with less than ten years of service.

5. Entered through either Academy, OCS/OTE, ROTC (Regular), or ROTC (Scholarship): These are the main avenues of entry for what are regarded as the core military employments. Other avenues of entry are

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[1]See, for example, [Ref. 29:p. 26].

available but are not regarded as prime sources of career officers. (Entry through one of the medical schemes may be regarded as an exception but it was decided not to include physicians in this analysis, because they do not behave in a similar fashion to other officers and have been the subject of considerable turnover research in their own right.)

6. Turnover to be voluntary and avoidable: The following classes of discharge were used;

   a. Expiration of term of service,

   b. Voluntary--to attend school or teach,

   c. Voluntary--in the national interest,

   d. Voluntary--unqualified resignation,

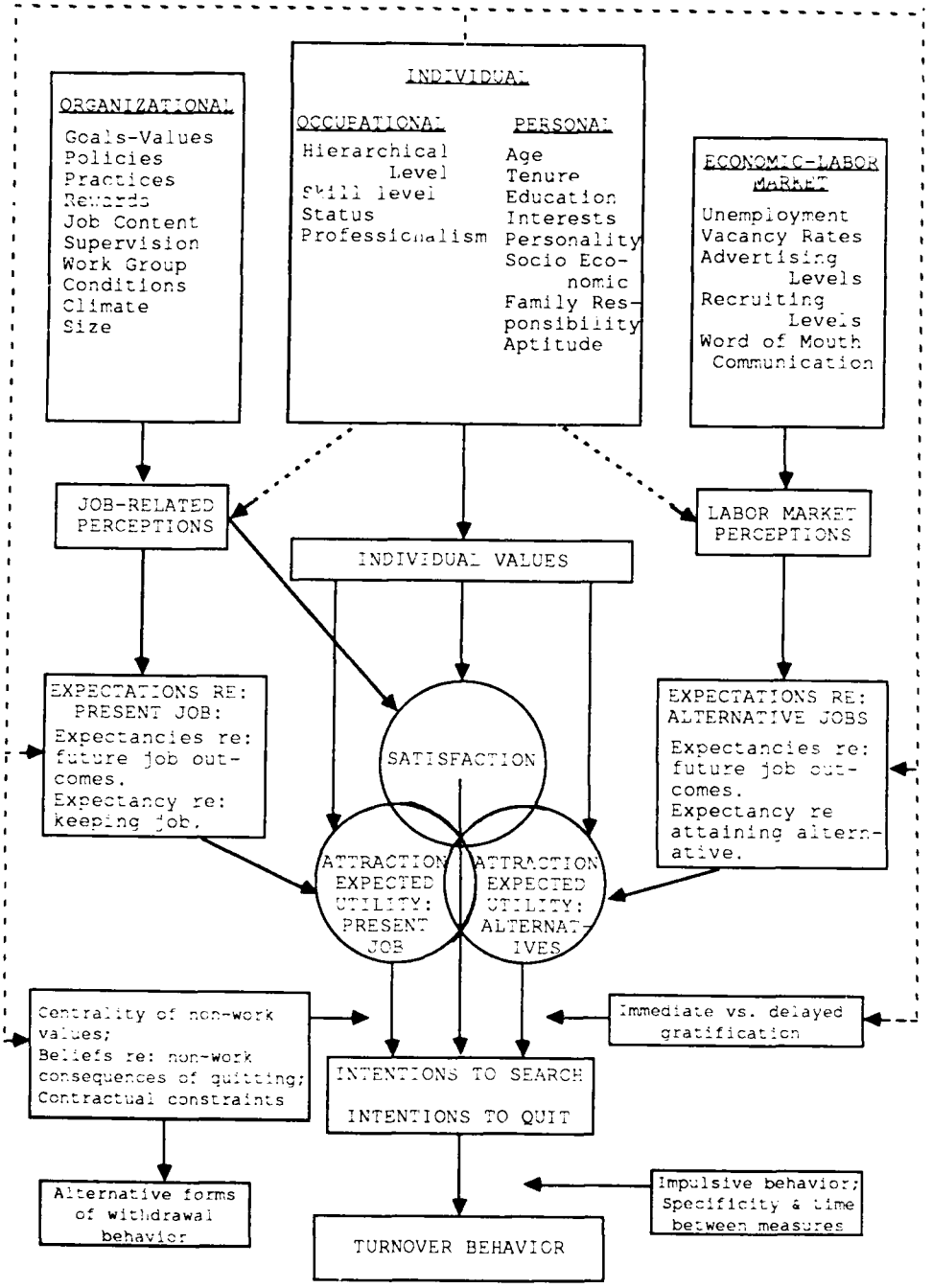
   e. Voluntary--other reasons.

These criteria eliminated all of those who were discharged for reasons such as medical, dependency or hardship, death, or failure to meet minimum behavior and performance criteria. The trend in the literature has been to expand the categories of leavers. Traditionally the distinction has been made between voluntary and non-voluntary turnover. More recently it has been suggested that distinctions should be made between functional and dysfunctional turnover [Ref. 30] and avoidable and unavoidable turnover [Ref. 31]. The data available for this research did not allow classification into functional and dysfunctional types, as performance ratings were not available. The distinction between avoidable and unavoidable turnover is substantially met by the discharge criteria used, however there is no way of knowing for certain whether turnover was actually unavoidable in any particular case.

The Defense Manpower Data Center carried out a file match of the Member Survey with the Loss File, and the Personnel Master File. It was therefore possible to identify whether or not respondents had subsequently left the Service. The turnover match was carried out for six monthly intervals, from December 1984 to September 1987 (the December 1987 files were not available at the time of the match, so September was included instead). In this way the predictive power of the survey data could be tested over a two and a half year period.

B. THE MOBLEY, GRIFFETH, HAND AND MEGLINO MODEL

The Mobley, Griffeth, Hand and Meglino model and the subsequent tests of it, were briefly summarized in the literature review. The model is shown in Figure 1. Although two investigations of the model have been reported (Michaels and Spector [Ref. 12] and Williams and Hazer [Ref. 20]), only one data set was collected. The Williams and Hazer study was simply a more sophisticated re-analysis of the Michaels and Spector data. In addition the Michaels and Spector study was not a test of the full model. They limited the variables tested to a "manageable subset" [Ref. 12 p. 54], which included age, tenure, salary, job level, consideration behavior by supervisor, task characteristics (measured on the Job Diagnostic Survey), job satisfaction, perceived alternative employment opportunities, intention to quit, and turnover. They also included two variables which



Source: [Ref. 2]

Figure 1. The Mobley, Griffeth, Hand, and Meglino Model of Turnover

were not part of the original model; confirmed pre-employment expectancies and organizational commitment.

That the full model has not been tested is not surprising, as it is both complex and comprehensive. Muchinsky and Morrow [Ref. 32] considered it to be the most highly integrated and comprehensive model developed up to the time of their review. The main barrier to a test of the model has been the expense and difficulty of collecting such a large amount of survey information at one time. Serendipitously the DoD survey contained information on a large number of the variables required by the model, so that a relatively comprehensive test could be attempted. Information on the particular effects of the military lifestyle is also contained in the survey and was incorporated into the model. The major shortfalls of the survey data were that it contained relatively little information on organizational characteristics and no economic information.[2] As a result the relative effects of the other variables in the model are likely to be overestimated to some extent, while the overall variance accounted for is likely to be less than for the full model. Nevertheless the relative richness of the data available in

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[2]Economic data could have been built into the data set, however, the analytic technique, to be discussed later, was not suited to the inclusion of categorical or dummy variables, so this approach was rejected.

all other major areas of the model promised to allow an extensive test of the links in the model.

The variables specified in the Mobley, Griffeth, Hand and Meglino model, together with the respective variables from the survey data and the additional variables pertaining to military lifestyle are set out in Table 3.

C. DESCRIPTION OF THE VARIABLES

A brief description of the variables included in the model follows. Further information on the variables can be found in [Ref. 28].

1. Age

Age was a continuous variable, measured in years, and was the response to the question, "How old were you on your last birthday?"

2. Tenure

Tenure was a continuous variable, measured in months and was the response to the question, "To the nearest year and month, how long have you been on active duty?"

3. Education

Education was a continuous variable, measured in years and was the response to the question, "As of today, what is the highest grade or year of regular school or college that you have completed and gotten credit for?" The

TABLE 3

VARIABLES SPECIFIED BY THE MODEL COMPARED TO VARIABLES AVAILABILE IN THE DOD SURVEY, PLUS MILITARY LIFESTYLE VARIABLES

MODEL VARIABLES	SURVEY VARIABLES
<u>Individual Personal Variables</u>	
Age	Age
Tenure	Time on active duty
Education	Highest grade of school or college
Interests	Nil
Personality	Nil
Socio-Economic	Included in education, income, etc.
Family Responsibility	Number of children
Aptitude	Nil
	Race
	Marital status
	Debts
<u>Individual Occupational Variables</u>	
Hierarchical Level	Pay grade
Skill Level	Nil
Status	Nil (other than pay grade)
Professionalism	Nil
	Method of entry
	Times moved
	Time overseas
	Time separated from spouse in last year
	Met expectations
	Regular military compensation
	Military occupation
<u>Organizational Variables</u>	
Goals-Values	Nil
Policies	Nil
Practices	Nil
Rewards	Nil
Job Content	Combat, Combat support, Combat service support
Supervision	Nil
Work Group	Nil
Climate	Morale at current location

TABLE 3 (CONTINUED)

Economic-Labor Market Variables	
Unemployment	Nil
Vacancy Rates	Nil
Advertising Levels	Nil
Recruiting Levels	Nil
Word of Mouth Communication	Nil
Expectations Re Present Job	
Future Job Outcomes	Expectation that future retirement benefits will be as good as now
	Expectation that pay and allowances will keep up with inflation
Keeping Job	Chance of promotion
	Chance of promotion to General
	Probability of remaining in military if General positions increased ten percent
Expectations Re Alternative Jobs	
Future Job Outcomes	Family better off if took civilian job
Attaining Alternative	Job offers in last year
	Probability of finding good civilian job
	Spouse probability of finding a good civilian job
Individual Values	
Satisfaction	Satisfaction measured by a series of variables, discussed below
Moderators	
Centrality of Non-Work Values	Nil
Beliefs Re Non-Work Consequences of quitting	Nil
Contractual Constraints	Time remaining in initial obligation
Immediate Versus Delayed Gratification	Nil
Impulsive Behavior	Nil
Specificity	Nil
Time Between Measures	6 monthly measures of turnover
Intention To Search	
Intention to Search	Looked for work in last year

TABLE 3 (CONTINUED)

Intention To Quit	
Intention To Quit	Intention to quit
Turnover Behavior	
Turnover Behavior	Turnover behavior

Limitations imposed by the analytic method, precluded the inclusion of categorical variables in the model. Time limitations imposed on thesis completion precluded the running of separate models controlling for all categoricals. As a compromise the model was run several times, controlling for marital status, method of entry, first term obligation and turnover period.

distribution of this variable displayed a very restricted range and was highly skewed. Sixty-three percent of the sample had completed 16 years of education, 14 percent 17 years, 14 percent 18 years, seven percent more than 18 years and only two percent less than 16 years. Serious departure from normality of the observed variables, violates an assumption that is necessary for maximum likelihood estimation. Given the relative homogeneity of the sample on this variable, it was dropped from the analysis.

4. Debts

A single item requested information on whether debts were in the dollar intervals; 0, 1-499, 500-1,999, 2,000-4,999, 5,000-9,999, 10,000-14,999, 15,000 and over. The distribution of this variable was bi-modal, with a peak at no debts and another in the 5000-9999 range. Within the range 1-over 15000, the distribution was reasonably normal. Despite the problems with the distribution it was decided to

retain this variable. The responses were recoded so that the mid point of the appropriate interval became the individuals score. A value of $25,000 was arbitrarily chosen as the mid point of the highest interval. The variable was treated as continuous.

5. Marital Status

Marital status was described in the survey as:

a. married first time,

b. remarried,

c. widowed,

d. divorced,

e. single, never married.

The widowed and divorced groups were very small (one and two individuals respectively), so these were excluded. Married and remarried were combined into one group.

6. Pay Grade

Pay grade is a military synonym for rank. The response codes for the ranks 01 to 04 were recoded 1 to 4 respectively and used as a continuous variable.

7. Method of Entry

Thirteen methods of officer entry are differentiated in the survey but Academy, OCS/OTE, ROTC (Regular), and ROTC (Scholarship) were the only methods included in this study. These are the prime sources of regular military officers, other avenues of entry being mainly for specialist officers or officers selected from the ranks or reserves.

8. Time Overseas

Many military personnel spend part of their career at an overseas location. The effects of this on turnover are unclear. While at first sight overseas postings might seem attractive, many military personnel do not view them this way and it is possible that they increase turnover. On the other hand, they are seen by some to be career enhancing, so there may also be some positive effect on turnover. The distribution of the variable was bi-modal, with large peaks at 0 months and 36 months and a relatively flat distribution otherwise. The departure from normality made this variable unsuitable for analysis using maximum likelihood techniques and it was dropped from the analysis.

9. Times Moved

Military personnel are subject to frequent moves, which can be disruptive to personal lives. A question sought information on the number of times a member has moved to a new location because of a permanent change of station (PCS). The variable was treated as continuous.

10. Time Separated from Spouse in Last Year

Military members can be separated from their families for a number of reasons. They may be away on a course or exercise, they may have left their family settled in one location while they took an unaccompanied PCS move or they may have moved in advance of their family (or vice versa) if a PCS move was expected at an inconvenient time.

A single question sought information on the number of months separated from spouse and dependents because of a military assignment. The distribution of the variable was bi-modal and heavily skewed and it was therefore not suitable for inclusion and was dropped.

11. Met Expectations

Met expectations was a single item, measured on a five point Likert scale (1 = strongly agree, 5 = strongly disagree), if "Life in the military is about what I expected it to be." The item was treated as continuous.

12. Regular Military Compensation

Military pay is made up of basic pay plus a number of allowances. Regular military compensation was measured by the sum of wages, basic allowance for subsistence, basic allowance for quarters, rental allowance, and variable housing allowance. These items were appended to the survey data, by DMDC, at the time the data set was constructed. The variable was treated as continuous.

13. Morale

A seven point Likert scale (1 = morale very low, 7 = morale very high) was used to answer the question, "How would you describe the morale of military personnel at your current location?" The variable was treated as continuous.

14. Satisfaction

The assessment of satisfaction was measured with a series of 19 questions, on a five point Likert scale (1 =

very dissatisfied, 5 = very satisfied). The first 18 questions asked, "Below is a list of issues particular to military way of life. Considering current policies please indicate your level of satisfaction/dissatisfaction with each issue?" The issues were;

a. personal freedom,
b. acquaintances/friendships,
c. work group/co-workers,
d. assignment stability,
e. pay and allowances,
f. environment for families,
g. frequency of moves,
h. retirement benefits,
i. opportunity to serve one's country,
j. satisfaction with current job,
k. promotion opportunities,
l. job training/in-service education,
m. job security,
n. working/environmental conditions,
o. post service educational benefits,
p. medical care,
q. dental care, and
r. commissary services.

The distribution of responses to the question on opportunity to serve one's country was highly skewed, so this variable was omitted.

A final question asked, "Taking all things together, how satisfied are you with the military as a way of life?" All variables in this group were treated as continuous.

15. Problems with PCS Moves

Problems experienced with PCS moves was measured with a series of 15 questions, measured on a four point Likert scale (1 = serious problem, 4 = not a problem). The question asked, "Think about your PCS move to your current permanent post. For each item below mark if it was: serious problem ..... not a problem." The items were;

a. adjusting to a higher cost of living,

b. moving and setting up a new household,

c. temporary lodging expenses,

d. costs of setting up new residence,

e. transportation costs incurred during move,

f. finding off-duty employment for yourself,

g. finding civilian employment for your spouse or dependents,

h. continuing your education,

i. continuing spouse/dependent education,

j. transferability of college credits,

k. finding permanent housing,

l. finding shopping areas,

m. recreational facilities, etc.,

n. children adjusting to new environment,

o. spouse adjusting to new environment, and

p. adjusting yourself to new environment.

The specific nature of many of these questions precluded their use in the survey (for example if a respondent was not currently studying, he did not answer that item). It was therefore decided to use only item b. as an indicator of the PCS move problem.

16. Expectations Re Retirement Benefits

Expectations re retirement benefits was measured by a single item which asked, "How much do you agree or disagree...(that) military personnel in the future will not have as good retirement benefits as I have now?" The item was measured on a five point Likert scale (1 = strongly agree, 5 = strongly disagree) and was treated as continuous. The variable was heavily right skewed and therefore not really suitable for use with LISREL. However it was one of only two variables contributing to the theoretical construct 'attraction expected utility of present job.' It was therefore retained.

17. Expectations Re Future Pay and Benefits

Expectations re pay and benefits was measured with a single item which asked, "How much do you agree or disagree ...(that) my military pay and benefits will not keep up with inflation?" The item was measured on a five point Likert scale (1 = strongly agree, 5 = strongly disagree) and was treated as continuous. This variable was also heavily right skewed, but as the only other contributor to attraction expected utility of present job, it too was retained.

18. Chance of Promotion

Chance of promotion was measured by a single item, on an 11 point Likert scale (1 = no chance, 11 = certain), which asked, "What do you think your chances are of being promoted to the next higher pay grade?" Unfortunately an option was provided in this question for those who intended to leave, and they did not rate their chance of promotion. Inspection of the individual cases who indicated an intention to leave here, revealed that a large proportion of them actually did leave (70 percent). The variable was therefore excluded from the analysis.

19. Chance of Promotion to General

Chance of promotion to General was measured with a single item on an 11 point Likert scale (1 = no chance, 11 = certain), which asked, "What do you think your chances are of being promoted to General during your career?" As in the previous variable, an option was provided for those who intended to leave. This variable was therefore also omitted from the analysis.

20. Remain in Military if General Positions Increased 10 Percent

The probability of remaining in the military, if the number of General positions was increased, was assessed with a single item, on an 11 point Likert scale (1 = no chance, 11 = certain), which asked, "How likely would you be to remain in the military if the number of General slots were

increased by 10%?" The intend to leave option was also provided for this variable, so it too was omitted.

21. Probability of Finding a Good Civilian Job

Probability of finding a good civilian job was measured with a single item, on an 11 point Likert scale (1 = no chance, 11 = certain), which asked, "If you were to leave the Service **NOW** and tried to find a civilian job, how likely would you be to find a good civilian job?" The variable was treated as continuous. This variable was heavily left skewed, but as the only indicator of 'attraction expected utility of alternatives,' it was retained.

22. Intended Remaining Service

Intended remaining service was constructed from two items in the survey; "To the nearest year and month, how long have you been on active duty?", and "When you finally leave the military, how many total years of service do you expect to have?" Both items were converted to months, then the first item was subtracted from the second to give an indication of the intended remaining service. The item was treated as continuous.

23. Turnover Behavior

As discussed previously voluntary turnover was identified from the DMDC personnel master file and loss file, at six monthly intervals. The variable was dichotomized for each period as stayers and leavers.

D. THE MODEL

As a preliminary step in setting up the model, principle components factor analysis was performed on the appropriate exogenous variables, discussed above. The factor structure, obtained using varimax rotation, is shown in Table 4.

This factor structure was used to specify the model. The proposed model (Model 1) is shown in Figure 2. The model is set up as a graphical representation of a structural equation model. The rectangles represent the observed data (X and Y variables). The ellipses represent the unobserved latent variables (ksi and eta variables), which underlie the observed variables. In the case of the ksi variables, these are the factors that were obtained from the factor analysis described above. The one way arrows represent the hypothesized effects of one variable on another. Variables which are correlated without any causal interpretation can be shown in such models as joined by a two way arrow. For clarity in the figure, these correlational links, of which there are many, have been omitted.

All constructs in the model, which are at any time in the causal process an endogenous variable, are classed as eta constructs. The coefficietns of eta constructs are labelled beta. All constructs which only function as exogenous variables are classed as ksi constructs. The

TABLE 4

FACTOR LOADINGS OF PRINCIPAL COMPONENTS FACTOR ANALYSIS, WITH VARIMAX ROTATION OF EXOGNEOUS VARIABLES: WHOLE SAMPLE

Variable	Loading
Factor 1. Tenure	
Length of Service	.93
Military Income	.92
Age	.90
Pay Grade	.81
Times Moved	.79
Factor 2. Intrinsic Job Satisfaction	
Satisfaction with Work Group/Co-workers	.70
Satisfaction with Current Job	.67
Satisfaction with Acquaintances/Friendships	.66
Morale at Current Location	-.64
Satisfaction with Personal Freedom	.59
Satisfaction with Working/Environmental Conditions	.58
Met Expectations	.49
Factor 3. Satisfaction with Support Systems	
Satisfaction with Dental Care	.82
Satisfaction with Medical Care	.82
Satisfaction with Commissary Services	.63
Factor 4. Satisfaction with Personal Development Opportunities	
Satisfaction with Job Security	.63
Satisfaction with Promotion Opportunities	.62
Satisfaction with Job Training	.50
Satisfaction with Post Service Educational Benefits	.50
Factor 5. Extrinsic Job Satisfaction	
Satisfaction with Pay	.77
Satisfaction with Retirement Benefits	.61
Factor 6. PCS Move	
Satisfaction with Frequency of Moves	.80
Satisfaction with Assignment Stability	.66
Problems with Moving and Setting up New Household	-.51
Factor 7. Debts	
Debts	.86

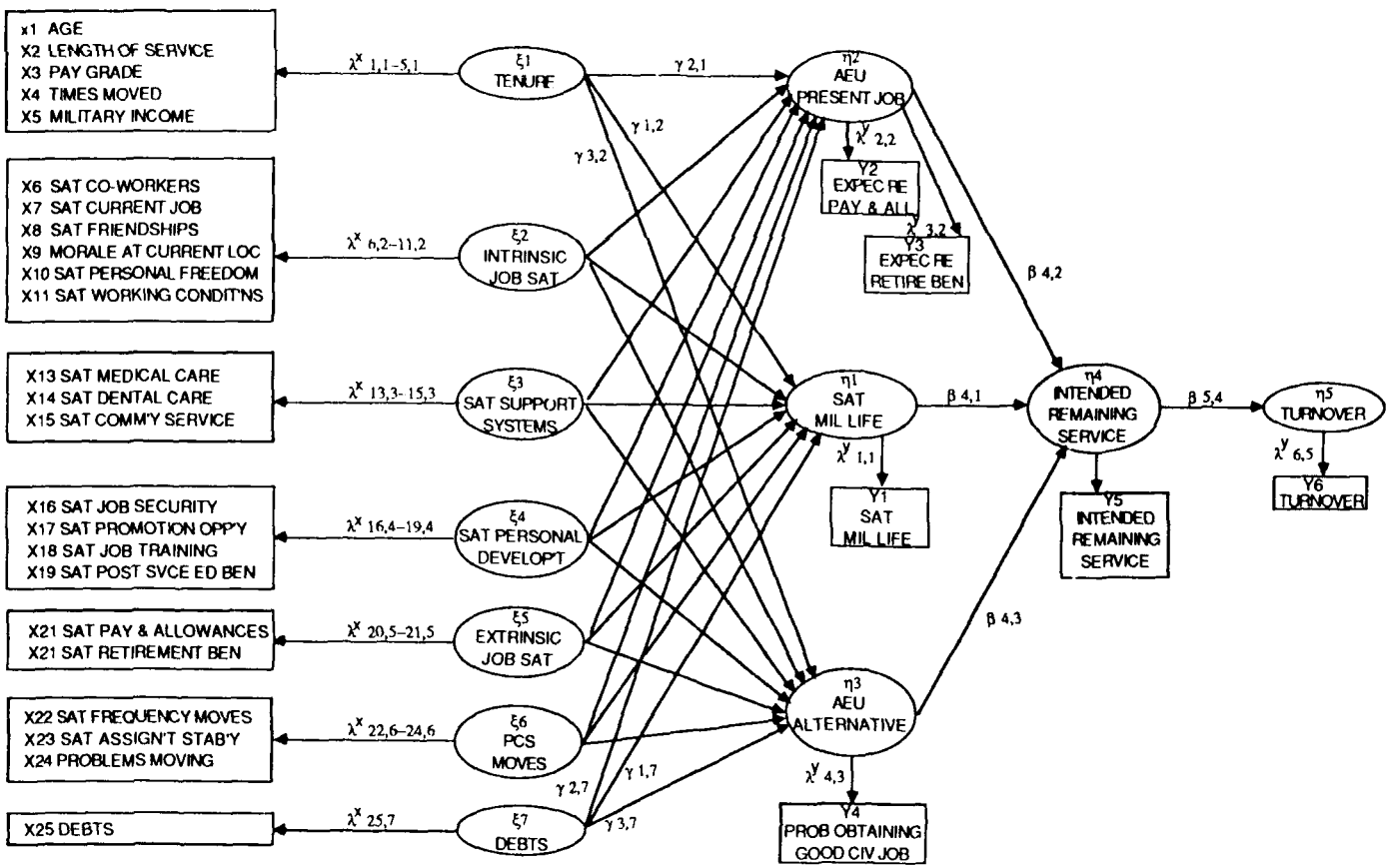

Figure 2. Proposed Model (Model 1), for a Test of the Mobley, Griffeth, Hand and Meglino Model of Turnover

coefficients of ksi constructs are labelled gamma. The error terms for the endogenous constructs are labelled zeta. The error terms for the exogenous variables are labelled delta, while their coefficients are labelled lambda. The error terms for the endogenous variables are labelled epsilon and their coefficients are also designated lambda. For clarity the error terms have been omitted from the figure.

IV. DATA ANALYSIS AND RESULTS

A. SELECTION OF ANALYTIC METHOD

The literature review indicated that three analytic methods have been preferred in the testing of turnover models; hierarchical analysis, path analysis, and, more recently, structural equation modelling. Simply stated, hierarchical analysis consists of a series of multiple regression equations, on the dependent variable, built up successively as independent variables are added in the order of their position in the causal chain. The effect on R^2 and the partial coefficients, of adding each independent variable, are observed.

A major shortcoming of this technique is that it is not always possible to specify the exact order of entry of independent variables. Given that the increment in R^2 attributed to any given variable may change considerably, depending on its entry position, a good deal of uncertainty exists in the interpretation of the results (Cohen and Cohen [Ref. 33]). In general the hierarchical technique has only been employed when the conditions necessary for a more sophisticated analysis are not met by the model or the independent variables. For example Lee and Mowday [Ref. 16] chose to use hierarchical analysis in their test of the Steers and Mowday model because the non-recursive system

implied by the model, would require instrumental variables to apply either path analysis or structural equations.

Path analysis allows a test of whether the pattern of correlations exhibited by a set of observed data, is consistent with a theoretical model. If the correlation matrix of the data can be substantially reproduced by using only the path coefficients specified by the model, the model is said to fit the data and survives (but is not proven). Modifications of the model can also be tested using path analysis. For example if a path (or paths) is deleted from the model and the correlation matrix is still substantially reproduced, the more parsimonious model may be accepted as a better fit (Kerlinger and Pedhazur [Ref. 34]).

A major difficulty associated with the application of path analysis, is that it is susceptible to biasing effects from measurement error. Williams and Hazer [Ref. 20] point out that the effects of measurement error in independent variables can not be predicted with certainty. Possible effects are the attenuation of coefficient estimates, coefficients with the wrong sign, or zero coefficients made to appear non-zero. In addition, Kerlinger and Pedhazur [Ref. 34] do not consider that path analysis is suited to the testing of models that exhibit reciprocal causation.

Structural equation models offer a solution to these problems and are being increasingly used, in model testing, in the social and behavioral sciences. Loehlin [Ref. 35]

describes structural equation models as an extension of path analysis. Each endogenous variable in the model is represented by an equation, which expresses that variable as a function of the causal paths leading to it.[1] The solution of the simultaneous equations provides the path coefficients to each endogenous variable. These path coefficients are simply the standardized partial regression coefficients of the endogenous variables. In order for the solutions to be calculated correctly, the model must be identified, i.e., a sufficient number of knowns must be entered into the equation set, to allow calculation of the unknowns.

Williams and Hazer [Ref. 20] employed structural equations in their test of the Mobley, Griffeth, Hand and Meglino model. To the extent that the current research is an extension and replication of their study, it was decided to adopt a similar approach to the analysis of the Army officer data. Because several variables in the model were categorical, the use of a data analysis method capable of handling categoricals (such as LISCOMP) would have been necessary. No such program was readily available and so this approach could not be used. LISREL V (Jöreskog and Sörbom [Ref. 36]) was available and was used to test the model.

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[1]The causal paths in the model are the representations of the theoretical links between the variables.

The use of LISREL V necessitated some modification of the model. Categorical variables can be used in LISREL V only if they represent fixed X variables. Categorical variables among the Y variables or categorical X variables which can not be fixed, can only be treated by making separate runs controlling for that variable. Since both time constraints and sample sizes did not make this approach feasible, it was decided to restrict the model applications to the following groups:

1. Whole sample,
2. Married officers,
3. Single officers,
4. Academy entry,
5. OCS/OTE entry,
6. ROTC(S) entry, and
7. ROTC(R) entry.
8. Initial obligation expired or expires within three years,
9. Turnover up to December 1985.

In addition to the procedural difficulties associated with the use of categorical variables, Lal [Ref. 27] has demonstrated the need to control aggregation bias. The splitting of the sample into those groups also achieves that end.

B. DATA SCREENING

The initial file match requested from DMDC was for all Army officer respondents to the survey. As previously discussed, from this file all male Army officers, with the following qualifications were selected:

1. Entry through the Academy, OCS/OTE, ROTC(R), or ROTC(S),
2. More than one year of service,
3. Less than 12 years of service,
4. Originally entered as an officer,
5. Reason for leaving (if left) was voluntary.

This selection process yielded a sample of 1342 officers, 199 of whom had left the Service in the period January 1985 to September 1987.

Screening for missing and inappropriate values, on the variables in the model, reduced the sample size to 1263. Some characteristics of the sample are listed in Table 5.

TABLE 5

DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE OF JUNIOR ARMY OFFICERS

Marital Status:	Married		Single		
	939		324		
Commissioning Source:	Academy	OCS/OTE	ROTC(R)	ROTC(S)	
	223	114	496	430	
Pay Grade:	2nd LT	LT	CAPT	MAJ	
	57	356	766	84	
Intended Remaining Service:	<1 Yr	1-2 Yrs	2-3 Yrs	3-4 Yrs	>4 Yrs
	50	64	72	52	1025

Table 6 shows turnover behavior by marital status, avenue of entry, and pay grade, for the sample.

TABLE 6

TURNOVER OUTCOME BY MARITAL STATUS, METHOD OF ENTRY AND PAY GRADE

		Turnover Outcome		
		In Service	Left Service	% Left
Marital Status	Married	831	108	13
	Single	247	77	31
Method of Entry	Academy	200	23	12
	OCS/OTE	92	22	24
	ROTC(R)	433	63	15
	ROTC(S)	353	77	22
Pay Grade	2nd LT	45	12	27
	LT	279	77	28
	CAPT	674	92	14
	MAJ	80	4	5

The table indicates that voluntary turnover of officers is, in general quite modest. For the 33 months, only 14.6 percent of the total sample left the service. This equates to a voluntary loss rate of just over five percent per year. The highest turnover rates were in the youngest age groups (single, 2nd LT and LT), and in the OCS/OTE and ROTC(S) method of entry groups. Turnover in the rank of MAJ was very modest. While the overall level of turnover might be

considered acceptable, the relatively higher losses in the younger, less senior groups may not be so. Army officers are expensive to train and although service obligations allow for recoupment of some of those training costs, the earlier an officer leaves the Service, the less the return on the initial investment. In addition, as all the turnover examined here is voluntary, it is reasonable to assume that it represents turnover that the Army would rather not have occur at all. While it is unrealistic and not desirable to attempt to reduce voluntary turnover to zero, in general the lower the voluntary turnover, the better the return on initial training investment will be. As long as the costs of retaining officers do not exceed the costs of recruiting and training replacements, it is in the interests of the Army to expend resources in improving voluntary retention.

C. RESULTS

1. Whole Sample Model

Model 1, depicted in Figure 2, could not be successfully run.[2] In estimating the parameters, the programme was exceeding 250 iterations and terminating the estimation procedure. This was indicative of instability in the estimation procedure, which was not allowing a solution. The small size of the determinant of the covariance matrix

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[2]All of the preliminary tests of the model were carried out on the whole sample, with turnover up to September 1987 as the dependant variable.

(D = 0.121D-05) indicated that there were near perfect linear relationships between two or more of the input variables. The variable correlation matrix was examined and high correlations were noted between age, length of service, pay grade, and regular military compensation. Age and regular military compensation were removed from the analysis and the model run again. This increased the determinant somewhat (D = 0.300D-03), indicating an improvement in its suitability for analysis, but it was still small compared to the diagonal elements of the covariance matrix. It was therefore decided to simplify the model.

To reduce both the complexity of the model and the problems caused by the intercorrelations of the X variables, the model was reduced by constructing X variables. This was achieved by summing the product of the variable score and the factor loading, for each factor. This approach decreased the determinant (D = 0.688D-01), but the iteration limit was still reached.

A similar model, using only the highest loading X variable for each factor, as an indicator variable for each ksi variable, was run next. This increased the size of the determinant (D = .333) to a satisfactory level and improved the estimation of the model, though some problems were still apparent. The estimation procedure was now being completed,

but identification problems were evident.[3] It was also apparent that the extrinsic job satisfaction and personal development variables, as judged by their modification indices, were not contributing to the model. Debts was also a possible source of problems due to its bi-modal distribution. The three X variables contributing to these ksi variables were therefore removed and the model run again. This model (Model 2) realized a further improvement in the fit. Though some identification problems were still evident, the normalized residuals indicated a moderate fit between Model 2 and the data.

Several indicators of fit, between theoretical model and observed data, are provided by LISREL V. The first of these is a Chi squared measure and its associated degrees of freedom. In LISREL V Chi squared is not interpreted as a test statistic but as a measure of goodness of fit. Small Chi squared values, relative to the number of degrees of freedom, indicate good fit. Large Chi squared values indicate poor fit. Unfortunately the measure is sensitive to departures from multivariate normality and sample size.[4]

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[3]A model is not identified if the combined model and data constraints fail to determine a set of unique estimates. That is, there is insufficient information in the system of equations to arrive at a unique solution of all the free parameters (i.e., those that are to be estimated).

[4]In particular, Browne [Ref. 38] has shown it is sensitive to kurtosis.

Large samples and departures from normality, inflate Chi squared over and above what might be expected from specification errors in the model. The large sample sizes and non-normal variables used in the current research, make Chi squared an unreliable indicator of the goodness of fit. Nevertheless reductions in Chi squared resulting from manipulation of the model variables, using the same sample, can be used as an indicator of improvement of fit of the model.

The second goodness of fit indicator is the goodness of fit index (GFI). Jöreskog and Sörbom define GFI as "a measure of the relative amounts of variances and covariances jointly accounted for by the model" [Ref. 36:p I.41]. They claim that GFI is relatively robust against departures from normality and is unaffected by sample size.[5] Though it is theoretically possible for it to take on negative values, its usual range is between 0 and 1, with higher values indicating better fit. Because its statistical distribution is unknown, there is no standard to compare it against. It can be used however to compare the fit of the model to different data sets.

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[5]Marsh, Balla and McDonald [Ref. 39] have recently claimed that GFI and AGFI are affected by sample size. They found that the only goodness of fit measure, in common use, in the assessment of confirmatory factor analysis, that was relatively independent of sample size, was the Tucker-Lewis index.

The third goodness of fit indicator is the adjusted GFI (AGFI), which is the GFI adjusted to take account of the degrees of freedom of the model. The range of this statistic should also be between 0 and 1, with higher values indicating better fit.

The final and most useful diagnostic of goodness of fit is the normalized residual matrix. A normalized residual greater than two in value is indicative of a specification error in the model and can provide information on the location of the error.

LISREL V also provides a plot of the normalized residuals (the Q plot) which gives a visual indication of the fit. If a straight line fitted to the plotted points has a slope larger than one, the model fits the data well. If the line has a slope close to 1 a moderate fit is indicated. Slopes of less than one indicate poor fit.

In addition to the goodness of fit indicators, LISREL V provides modification indices which can be applied to improve the fit of the model. The modification index for each parameter is an estimate of the amount by which Chi squared could be improved if the constraint associated with the parameter is relaxed. The usual approach is to relax the constraint associated with the largest modification index, if that makes sense within the context of the model theory and if the values of the parameter can be clearly interpreted.

The goodness of fit indicators for Model 2 are shown in Table 7.

TABLE 7

GOODNESS OF FIT INDICATORS FOR MODEL 2

Chi Squared	DF	GFI	AGFI
128.81	11	.979	.897

Some normalized residuals, with values greater than 2, were evident in the normalized residuals matrix. However the Q plot exhibited a slope of approximately 1, indicating a moderate fit of the model.

There were some problems with the model. In particular it was (possibly) not identified and the covariance matrix of the endogenous concepts error measurements (theta epsilon) was not positive definite.[6] LISREL V prints a warning if these conditions arise. In the event of such problems some steps can be taken to recover the model.

Non-positive definite diagonal matrices can be made positive definite by fixing the negative element at a small positive value. The implications of this procedure are not too serious for the model. The fixing of an error variance at a small non-negative value, simply implies that factors

[6]A matrix is not positive definite if it is diagonal and one of the elements takes on a negative value.

other than the hypothesized underlying construct can affect the indicator variable. It also acknowledges some unreliability in the measurement of the construct [Ref. 37:p. 118].

Non-identified parameters can be identified by fixing them at an appropriate value. A value close to the estimate provided by the model is one option for fixing the value of the parameter and was the approach adopted here.

Because of the interrelatedness of the model, the fixing of one element of a matrix effects the estimates of other elements of that and other matrices, possibly making them non-positive definite or not identified. It can therefore be necessary to run the model several times making corrections as necessary. A further implication of the fixing of some parameters is that other parameter estimates will become less than optimal if an incorrect value is chosen.[7] Fortunately a check on the appropriateness of the chosen value can be made by monitoring the effect of the change on the normalized residuals. A large change in the shape or orientation of the Q plot indicates that an inappropriate value has been chosen.

The process described above was applied to the model, to attempt to identify it and improve the fit.

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[7]Because LISREL uses maximum likelihood techniques to estimate the parameters, the fixing of an incorrect value will affect the estimates of the other parameters and the statistical fit will be compromized.

First, non-identified parameters were identified as was necessary and non-positive definite matrices were made positive definite. Modification indices were then examined and if the indicated change made sense within the bounds of the model, it was made.

After fixing Model 2 as described above, the maximum modification index was in the error term covariance matrix for the observed variables (theta delta), between satisfaction with dental care (the indicator variable for the construct satisfaction with support systems) and satisfaction with frequency of moves (the indicator variable for PCS moves). While at face value these two concepts may seem to be unrelated, an argument could be made that the PCS construct is related to the support systems provided by the Service. The military has developed a number of systems which support military members during their PCS moves (the removal system, allowances, special leave and provision of military housing are examples). The PCS move construct may be tapping satisfaction with these PCS support systems and it is feasible that it is related to satisfaction with other support systems provided by the military.

To relax the constraint on the error term correlation, a path was set between satisfaction with frequency of moves and the construct, satisfaction with support systems. This entailed the removal of the construct PCS Move, as it no longer had an independent index variable.

The resulting model (Model 3) is shown in Figure 3. The goodness of fit statistics for Model 3 are shown in Table 8.[8]

The Q plot had a slope slightly greater than 1, indicating a moderate fit of the model. The effects of serially fixing the adjusted parameters were very small. Chi squared increased marginally (by .02) and the slope of the Q plot decreased slightly. The normalized residual matrix indicated that the errors were primarily associated with the exogenous variable, satisfaction with frequency of moves. The modification index indicated that the greatest improvement (31.6) could be obtained by relaxing the constraint in Theta Delta between satisfaction with support systems and length of service. An attempt was made to relax this constraint by creating paths from satisfaction with dental benefits and satisfaction with frequency of moves, to the tenure construct. However the fit of the model got worse rather than better. Chi squared increased to 265.83 and the Q plot became S shaped, with a fitted straight line slope of less than 1. This modification was therefore rejected and eliminated from the model.

Up to this stage, paths between each of the Ksi constructs and the Eta constructs had been left free (i.e.,

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[8]For each of the models presented here, only the final version (after all necessary parameters have been fixed) will be reported. The parameters that were fixed will be indicated and the effect on the overall fit commented on.

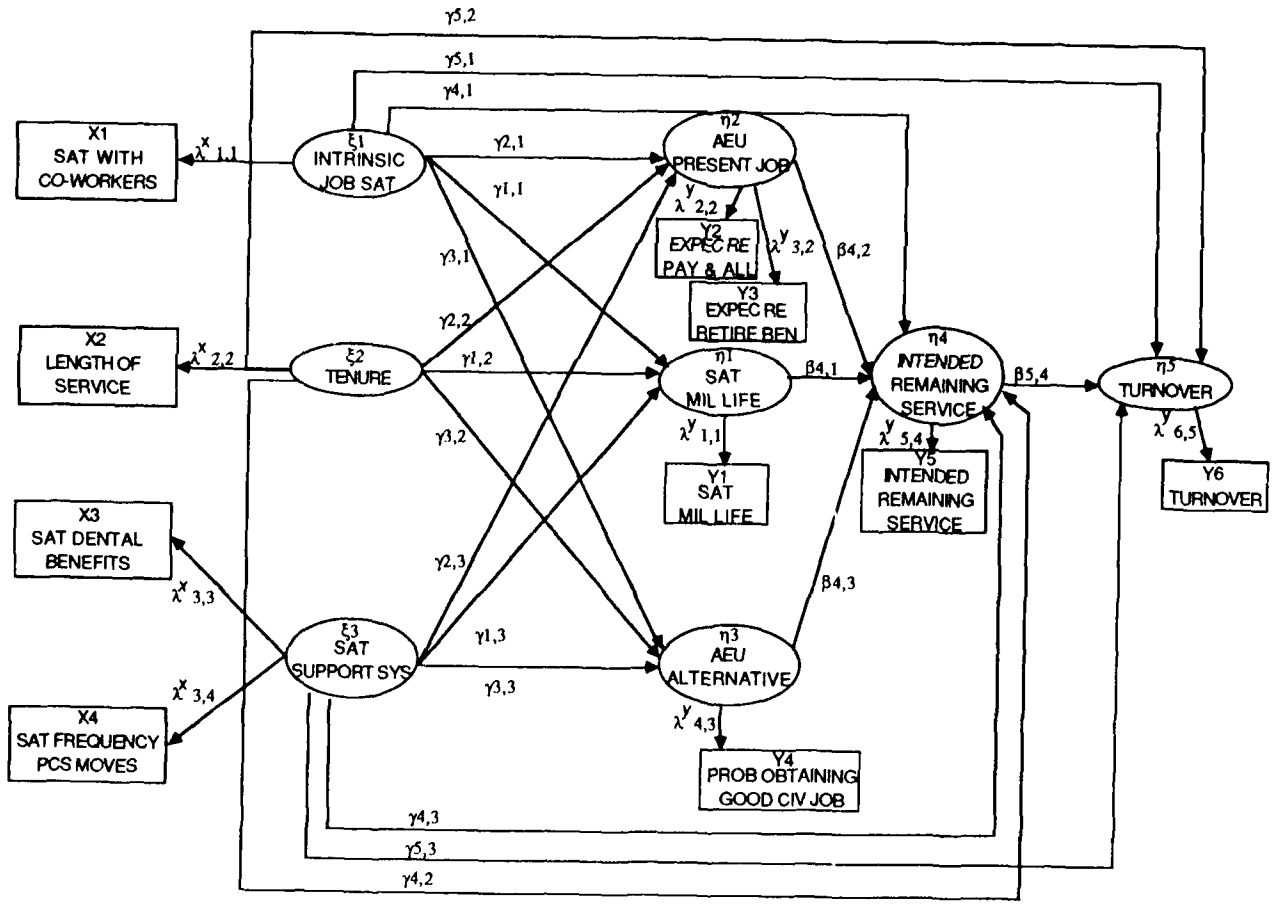

Figure 3. Final Model (Model 3), for a Test of the Mobley, Griffeth, Hand, and Meglino Model of Turnover

TABLE 8

GOODNESS OF FIT INDICATORS FOR TURNOVER MODEL 3, WHOLE SAMPLE (N = 1263)

Chi Squared	DF	GFI	AGFI	Fixed Parameters*
76.91	20	.988	.968	TD(1,1) TE(1,1) TE(4,4) TE(6,6)

*TD = Theta Delta, TE = Theta Epsilon

the relationship between tenure and intended remaining service, for example, had not been constrained to zero). The Mobley, Griffeth, Hand and Meglino model actually suggests that the effects of the Eta constructs should all be channeled through the first three Etas, satisfaction with military life and the two attraction expected utility constructs. Having arrived at a working model a run was made restricting the paths between the three Ksis and the Etas intended remaining service and turnover. The fit of the model declined dramatically and it was decided to continue to allow the paths between all Ksis and Etas to be estimated. Model 3 therefore became the general model for testing.

2. Married Sub-group Model

The model was next run on the married portion of the sample. The statistics are shown in Table 9. The Q plot had a slope of slightly greater than 1, indicating a moderate fit of the model to the data. The effects of

TABLE 9

GOODNESS OF FIT INDICATORS FOR TURNOVER MODEL 3, MARRIED GROUP (N = 919)

Chi Squared	DF	GFI	AGFI	Fixed Parameters*
63.64	21	.987	.965	TD(1,1) TE(1,1) TE(4,4) TE(5,5) TE(6,6)

* TD = Theta Delta, TE = Theta Epsilon.

serially fixing the necessary parameters were quite small. Chi squared increased by 1.48 and AGFI decreased by .01.

3. Single Sub-group Model

The model was then run on the single portion of the sample. The statistics are shown in Table 10.

TABLE 10

GOODNESS OF FIT INDICATORS FOR TURNOVER MODEL 3, SINGLE GROUP (N = 316)

Chi Squared	DF	GFI	AGFI	Fixed Parameters
27.18	20	.983	.954	TE(1,1) TE(4,4) TE(6,6) TD(1,1)

* TD = Theta Delta, TE = Theta Epsilon.

Procedural difficulties were encountered on the first run of this model. The program was unable to achieve reasonable, initial parameter estimates and the results showed a very poor fit between the data and the model. To check to see whether this failure was the result of the initial estimate

failure or was actually representing the true fit, the parameter estimates for the whole sample were input as the initial estimates for the single sub-group. The run was successful, indicating that it was the failure to make reasonable estimates that was the problem. The Q plot for this run indicated a good fit of the model. The effects of fixing the necessary parameters were to increase Chi squared by .6 and AGFI by .01 and decrease GFI by .001.

4. Academy Sub-group Model

Next the model was run for each avenue of entry. The goodness of fit statistics for the Academy portion of the sample are shown in Table 11.

TABLE 11

GOODNESS OF FIT INDICATORS FOR TURNOVER MODEL 3, ACADEMY GROUP (N = 222)

Chi Squared	DF	GFI	AGFI	Fixed Parameters*
48.16	23	.962	.910	TD(1,1) TD(2,2) TE(1,1) PS(1,1) PS(2,2) PS(3,3)

* TD = Theta Delta, TE = Theta Epsilon, PS = Psi.

The Q plot indicated that the model fit the data moderately well, the slope of the line being both greater than 1, and steeper than any of the previous runs. The effects of serially adjusting the necessary parameters were more

pronounced in this case. Chi square increased by almost 30, GFI decreased by .021, and AGFI by .032.

5. OCS/OTE Sub-group Model

The goodness of fit statistics for the OCS/OTE portion of the sample are shown in Table 12.

TABLE 12

GOODNESS OF FIT INDICATORS FOR TURNOVER MODEL 3, OCS/OTE GROUP (N = 113)

Chi Squared	DF	GFI	AGFI	Fixed Parameters*
18.22	20	.970	.918	TD(2,2) TD(1,1) TE(4,4) TE(6,6)

* TD = Theta Delta, TE = Theta Epsilon.

The Q plot indicated that the model fit the data quite well. The slope of the line was somewhat steeper than any of the previous runs. The effects of serially fixing the necessary parameters was in this case minimal.

6. ROTC(R) Sub-group Model

The goodness of fit statistics for the ROTC(R) portion of the sample are shown in Table 13. On the first run of this model, the iteration limit was exceeded and the general indications were that the fit was poor. Fixing the necessary parameters resulted in the estimation process being completed, however the fit of the model was still poor. The Q plot, fitted straight line, had a slope of less than one.

TABLE 13

GOODNESS OF FIT INDICATORS FOR TURNOVER MODEL 3,
ROTC(R) GROUP (N = 485)

Chi Squared	DF	GFI	AGFI	Fixed Parameters*
111.58	24	.956	.900	TD(2,2) TE(1,1) TE(4,4) TE(5,5) TE(6,6) PS(1,1) PS(2,2) PH(3,3)

* TD = Theta Delta, TE = Theta Epsilon, PS = Psi, PH = Phi.

7. ROTC(S) Sub-group Model

The iteration limit was also exceeded on the ROTC(S) run but the fit of the model appeared to be better for this sub-group than for the ROTC(R) group. Following fixing of the necessary parameters the goodness of fit statistics, shown in Table 14, were obtained.

TABLE 14

GOODNESS OF FIT INDICATORS FOR TURNOVER MODEL 3,
ROTC(S) GROUP (N = 485)

Chi Squared	DF	GFI	AGFI	Fixed Parameters*
72.48	21	.973	.929	TD(1,1) TE(1,1) TE(4,4) TE(5,5) TE(6,6)

* TD = Theta Delta, TE = Theta Epsilon.

The effects of fixing the necessary parameters were an increase in Chi squared of 3.76 and AGFI of .018 and a decrease in GFI of .001.

8. Reduced Turnover Period Model

To check the effect of the length of the period allowed for turnover to occur, the model was run, using the whole sample, but using turnover at the end of 1985 as the dependent variable. The goodness of fit statistics are shown in Table 15.

TABLE 15

GOODNESS OF FIT INDICATORS FOR TURNOVER MODEL 3, WHOLE SAMPLE, TURNOVER AS AT DECEMBER 1985 (N = 1263)

Chi Squared	DF	GFI	AGFI	Fixed Parameters*
105.57	20	.984	.957	TD(1,1) TE(1,1) TE(4,4) TE(6,6)

* TD = Theta Delta, TE = Theta Epsilon.

The effects of fixing the necessary parameters were an increase in Chi squared of .09 and AGFI of .011. GFI remained the same.

9. Effect of Initial Obligation

The Mobley, Griffeth, Hand and Meglino model includes contractual constraints as a moderator variable between intention to quit and turnover. Army officers are frequently constrained in their turnover behavior because they incur obligations to serve at various stages in their career. The data available for this study only included information on the initial obligation incurred. As a check on the effect of this obligation, the model was run for that

group who either had no obligation, or whose obligation would expire in three years or less.[9] The results of that run are shown in Table 16.

TABLE 16

GOODNESS OF FIT INDICATORS FOR TURNOVER MODEL 3, WHOLE SAMPLE, THOSE NOT CONSTRAINED BY INITIAL OBLIGATION (N = 1162)

Chi Squared	DF	GFI	AGFI	Fixed Parameters*
115.15	20	.982	.937	TE(1,1) TE(4,4) TE(5,5) TE(6,6)

* TD = Theta Delta, TE = Theta Epsilon.

The Q plot for the model indicated only a moderate fit, the slope of the fitted straight line being approximately 1.

10. Predictive Power

As a final check of the goodness of fit of the model, a test of its predictive ability was made, for the whole sample, for turnover up until September 1987. As a first step, a probit regression was run. The obtained coefficients are shown in Table 17.

Using these coefficients, a predicted turnover score was calculated for each case. The probability of obtaining that predicted score was then calculated and the mean of the

[9]This selection procedure did not exclude those who may have incurred an obligation subsequent to their initial obligation. However as no information was available, nothing could be done about this potential confounding of the model.

TABLE 17

PROBIT REGRESSION OF MODEL VARIABLES
AGAINST TURNOVER UP TO SEPTEMBER 1987

Variable	Coefficient
Intended Remaining Service	-.05531
Satisfaction with Military Life	-.11084
Expectations re Pay and Allowances	.00079
Expectations re Retirement Benefits	.07964
Probability of Obtaining Good Civilian Job	.03462
Satisfaction with Co-Workers	-.04558
Length of Service	-.00890
Satisfaction with Dental Benefits	.03633
Satisfaction with Frequency of Moves	.03569

predicted probability determined. Each case was then classified in relation to its value compared with the mean probability, the mean being the best estimate of the cutoff criterion avaailable. If the probability was greater than or equal to the mean probability, turnover was predicted. If it was less than the mean, retention was predicted. The predicted turnover was then crosstabulated with actual turnover. The resulting table is shown in Table 18.

TABLE 18

CROSSTABULATION OF PREDICTED TURNOVER
WITH ACTUAL TURNOVER

		Predicted Turnover		
		Stay	Leave	Row Total
Actual Turnover	Stay	867	211	1078
	Leave	57	128	185
	Row Total	924	339	1263

The model classified 80 percent of the stayers correctly and 69 percent of the leavers, with an overall prediction success rate of 78.7 percent. This compares with a 'no prediction' error rate (i.e., assuming that no one will leave) of 15 percent.

V. DISCUSSION

A. INDIVIDUAL MODELS

1. Model 1

The attempt to run a large scale test of the Mobley, Griffeth, Hand and Meglino turnover model, employing a significant number of the variables included in the model, was a failure. The possible reasons for that failure fall into three general categories:

a. Shortcomings in the data,

b. Procedural difficulties,

c. Model specification problems.

a. Data Problems

The survey data used for this analysis was originally collected to study the effects of military life on retention. As such it contains a large number of variables potentially useful for testing turnover models. It was not, however, specifically designed to test any particular theory of turnover or with any model in mind. In attempting to apply it to the Mobley, Griffeth, Hand and Meglino model, several shortcomings in the data became evident.

First, not all areas of theoretical interest in the model were represented in the data. In particular organizational variables, expectations re present and

alternative jobs, attraction-expected utility of present and alternative jobs, contractual constraints, and intention to search, were poorly measured. In some cases, in particular the organizational variables, data were not available. In others, although the area had been addressed in the survey, the data were not usable. For example the questions dealing with expectation of promotion, provided those with an intention to leave an option not to answer the question. The information could not then be used. In other instances only partial information was available. For example, while the survey addressed the issue of first term obligations, it did not gather information on subsequent obligations. In 12 years of service it is likely that a good proportion of officers will commit to further obligated service, in return for education or other training, or retention bonuses. The omission of this data is significant for any reasonable test of the model. An obligation can prevent someone who really would like to leave from doing so. It may be that the profile of a stayer who would really like to leave is similar to that of a leaver. If there are a significant number of these obligated stayers, they would have the effect of reducing the differences between stayers and leavers as classified by the model. A partial check on the effects of obligation was attempted by examining the effects of removing all those who had an initial obligation in the turnover period. This will be discussed later.

Second, the variables in the model were measured with single items of unknown validity and reliability. In model testing it is usual to use well researched measure of the theoretical constructs, where these are available. For example, the measurement of job satisfaction is normally done with a measuring instrument with known characteristics. Here, job satisfaction was inferred from the factor structure of the exogenous variables. In addition, it is desirable in model testing, to have more than one measure for each theoretical construct. In this instance it was often the case that only a single item was available and that not always suitable. For example, probability of obtaining alternative employment was the only measure of attraction-expected utility of alternatives. Even though its distribution was highly skewed, it either had to be included in the analysis or that construct would have had to be dropped.

A further problem was the actual turnover rate of the officers in the sample. At slightly over five percent per year, the pool of people who turnover is relatively small. Three consequences flow from this. First, there is a base rate problem. If over the three year period only 15 percent of officers leave, predicting that all will stay, will give only a 15 percent error in prediction at the end of three years. It is unlikely that a psychological model could come anywhere near this accuracy

and serious questions about the worth of the model are raised. Second, small numbers in the criterion group become restrictive when trying to divide the sample, to examine some relationship between variables. Finally, the small turnover numbers made it infeasible to employ split-sample cross validation, as a further check on the fit of the model.

b. Procedural Difficulties

The lack of availability of an analytic package, such as LISCOMP, capable of handling categorical variables, restricted the inclusion of many variables of theoretical interest. Many of the variables that it would have been desirable to include in the model, such as employment type, life course stage, and whether or not the respondent had looked for a job in the last year, could not be used. In addition LISCOMP would have made it possible to include some of those continuous variables, eliminated because they were not normally distributed, by dichotomizing them.

c. Model Specification Problems

A final possibility to explain the poor fit between the model and the data, is that the model is not correctly specified. The normalized residual matrix provided by LISREL V can be used to assess whether specification errors have been made. Jöreskog and Sörbom [Ref. 36] indicate that a normalized residual that is greater than two is indicative of a specification error.

The normalized residual matrix for Model 1 contained many such values possibly indicating incorrect specification of the model. However, given the other known data problems and the small determinant of the covariance matrix, a clear interpretation of the model specification problems was not possible.

2. Model 2

The improvement of fit from Model 1 to Model 2, was an indication that the simplification process was proceeding in a fruitful direction. However the modification index indicated that the constructs satisfaction with support systems and PCS moves had correlated effects on the other constructs. The combining of these two into a single construct resulted in Model three.

3. Model 3

The results of the run of Model 3 gave a further indication that the simplification process was leading towards a better fitting model. The use of the modification index to improve the fit of the model is open to some criticism, in that there is a danger that the model will be modified to fit the data and hence capitalize on any data peculiarities. It is therefore essential that changes made, using the modification index as a guide, fit the theoretical model and can be interpreted in a way that is consistent with the theory. In this way the danger of capitalizing on chance associations is reduced but not eliminated. Other

than to conduct another test, on a separate set of data, there is no way of knowing whether changes made in this way are 'correct.'

The effects of creating the path between satisfaction with frequency of moves and the construct, satisfaction with support systems, while at the same time eliminating the PCS construct, were beneficial for the fit of the model. Chi squared decreased by 52 and GFI and AGFI increased by .009 and .071 respectively. The failed attempt to further relax the model, by creating the paths from satisfaction with frequency of moves and satisfaction with dental benefits to tenure, indicated that the model had been simplified as far as possible. It was therefore decided to retain this as the model to test on the various data subsets.

Figure 4 shows the model, for the whole sample, with the estimated parameters for each of the paths. The parameter estimates marked * have t values that, had the model been a better fit, would have indicated that they were significantly different from zero.[1] To simplify the

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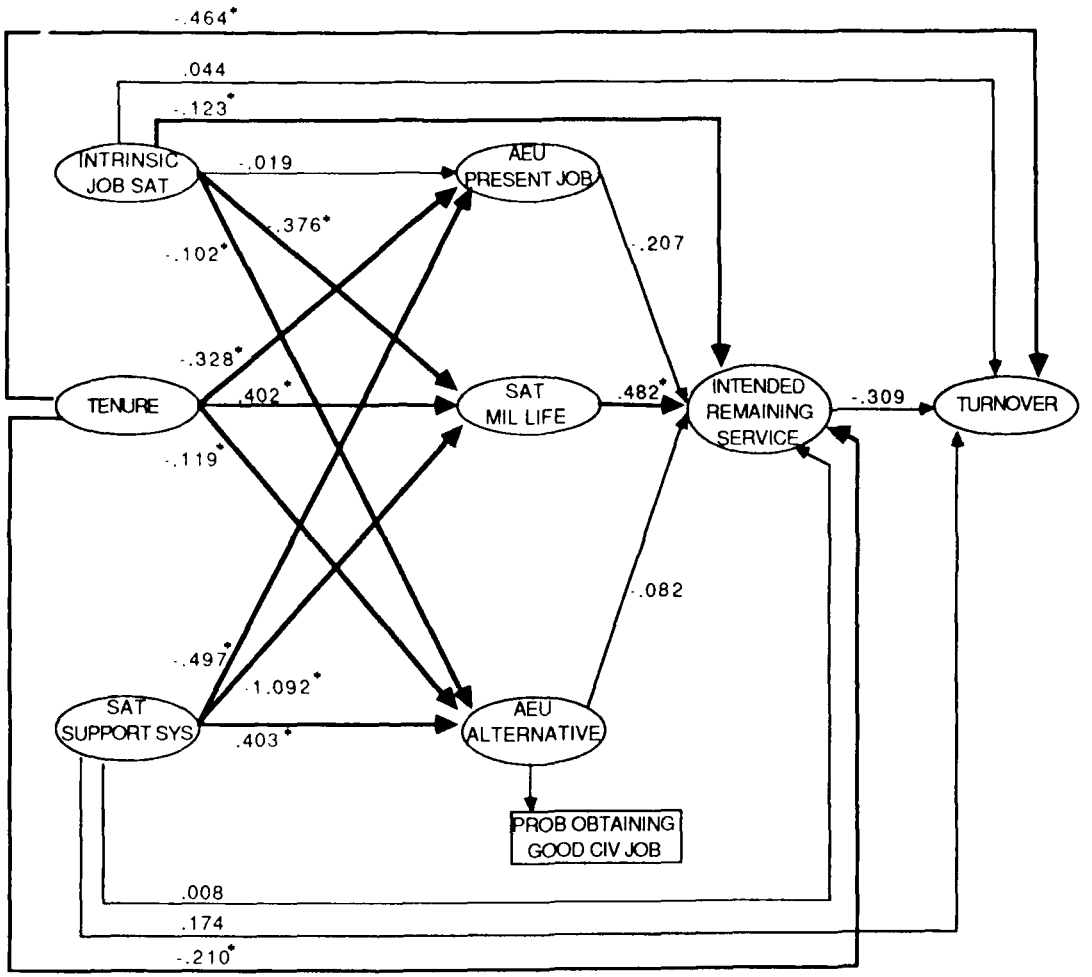
[1]LISREL V produces t values for each of the estimated parameters, with t defined as the parameter estimate divided by its standard error. t Values larger than two are taken to indicate that the parameter is significantly different from zero. Unfortunately these t values are only reliable when the fit of the model is good. In cases where the fit is somewhat less than good the t values can only be used to provide rough estimates of the significance of the parameters.



* = Significant

Figure 4. Path Diagram Showing Estimated Parameters: Whole Sample, N = 1263, Turnover = 184

discussion, these possibly significant factors, will be referred to as significant. Several interesting characteristics are evident in the model:[2]

The paths from attraction-expected utility of present job and attraction-expected utility of alternatives, to intended remaining service are not significant. Perhaps this is not surprising, as the observed indicators of the two attraction concepts were not really suited to the analysis because of their skewed distributions. However, when the model was run eliminating the two attraction constructs and their associated indicators, the fit of the model became much worse. The attraction constructs therefore do seem to be adding something to the model. More and better indicators of these constructs might help resolve the nature of their relationship with intended remaining service.

The path between intended remaining service and turnover is not significant, though it does approach significance ($t = -1.848$). There is however a significant path between tenure and turnover. This result was foreshadowed during the process of developing the model, when the attempt to constrain the paths from the Ksi constructs to intended remaining service and turnover, resulted in a worsening of the fit of the model.

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[2]There are many negative parameters in the model but these are due to reverse coding of variables and are not indicative of problems with the model.

The finding is at odds with the Mobley, Griffeth, Hand and Meglino model, which does not include paths other than through the intervening variables job satisfaction (or in this case satisfaction with military life) and intention to quit. There have been conflicting findings on this point in the past. For example Price [Ref. 6] proposed that demographic variables should not have a direct effect on turnover but should act through job satisfaction. Bluedorn [Ref. 7], in his review of the research on Price's model, concluded that direct links between demographic variables and turnover have been demonstrated. In this instance it would seem that there is a strong negative effect of tenure on turnover, quite independent of its effect through satisfaction with military life and intended remaining service.

The relationship between tenure and turnover demonstrated here, brings in to question its placement in the model, in relation to the other variables. The Mobley, Griffeth, Hand and Meglino model is a recursive system, but it is possible that tenure is reciprocally related to other variables in the model. For example, it is possible that the relationship between tenure and satisfaction with military life is a two way flow. Another alternative is that turnover is a moderator variable rather than a causative one. This possibility is reinforced by the demonstrated difference in turnover patterns for the younger

officers. It may therefore be appropriate to run the model for various length of service groups, rather than include tenure in the causal chain.

The lack of significance in the path between intended remaining service and turnover is surprising. The literature provides no instances where the link between intention to turnover and turnover is not demonstrated. There are several possible explanations of this result. First, intended remaining service is not a direct measure of intention to quit. This variable was constructed from two questions, one dealing with length of service to date, the other with intended total length of service. As such it may not be an effective measure of intention to quit. Second, intention to quit is usually represented in models as a dichotomous choice, whereas in this instance it was represented as a continuous variable. This may have acted to weaken the relationship between the two variables. Third, aggregation error in the whole sample could be affecting the relationship between intended remaining service and turnover. It is also possible, that because the fit of the model is only moderate, the t value is sufficiently affected so as to disguise the real connection between the two variables. A comparison of the value of the parameter across the various groups, indicated that the estimate for the whole sample was on the low end of the range, though two lower estimates were significant in other

models. This adds some strength to the conclusion that, for this model, the link was in fact not significant.

Tenure also displayed a significant, negative, direct relationship with intention to turnover, which is not a path hypothesized in the Mobley, Griffeth, Hand and Meglino model, nor does it have the expected sign. Similar reasons to those discussed above may account for this relationship. In addition, two other factors may be contributing to the relationship. First, length of service is the X variable used to measure tenure and it is also used to construct intended remaining service. Some covariance can be attributed to this common link with length of service. Second, the measurement of this relationship is likely to be confounded by two opposing effects. As was earlier demonstrated there is a negative relationship between age and turnover, that is, younger officers get out at a much higher rate than the older officers in the sample. However, it is likely that, overall, younger officers intend to continue to serve for a longer period than the older ones, simply because the older officers have already completed a significant proportion of a normal Army career. The relationship between tenure and intended remaining service is therefore not likely to be linear. The argument for a confounding of this relationship is supported by the fact that both tenure and intended remaining service have the expected relationship with turnover.

The option for Army officers to retire after 20 years of service, probably influences their response to any question regarding intended length of service. The presence of this early retirement option may make tenure a poor variable for modelling with military samples.

The strong path between satisfaction with support systems and attraction-expected utility of alternatives, demonstrates the importance of ancillary benefits in negating the perceived attractions of outside employment.[3] Satisfaction with support systems also has a strong link with attraction-expected utility of current job, which emphasizes its importance as an attraction. Despite these links, the only effect on turnover of satisfaction with support systems, is through satisfaction with military life and subsequently intended remaining service (and this final link is not significant).

The path between intrinsic job satisfaction and satisfaction with military life is, as might be expected, highly significant. As is predicted by the Mobley, Griffeth, Hand and Meglino model, it does not have any significant direct effects on intended remaining service or turnover.

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[3]The parameter has a positive sign because of reverse coding.

4. Model 3, Married Subgroup

The model for the married group, showing estimated parameters is shown in Figure 5. There are many similarities between this group and the whole sample. Given that it comprises 73 percent of the total group this is not surprising. A comparison of the goodness of fit measures indicated that the whole group data fit the model slightly better than the married data. Although the whole group Chi squared is 13 points larger, both GFI and AGFI are slightly larger for the whole sample.[4] As with the whole sample, there are direct links from tenure to intended remaining service and turnover, contrary to the predictions of the Mobley, Griffeth, Hand and Meglino model.

There are two major differences between the married model and the whole sample. The most notable is that the path between intended remaining service and turnover is significant in the married model. The path between tenure and turnover is, contrary to the prediction of the model, still present. The second difference is that the path between attraction-expected utility of present job and intended remaining service is also significant. This path has an unexpected sign and is possibly indicative of a specification error in the model. An examination of the normalized residual matrix, did not give any indication that

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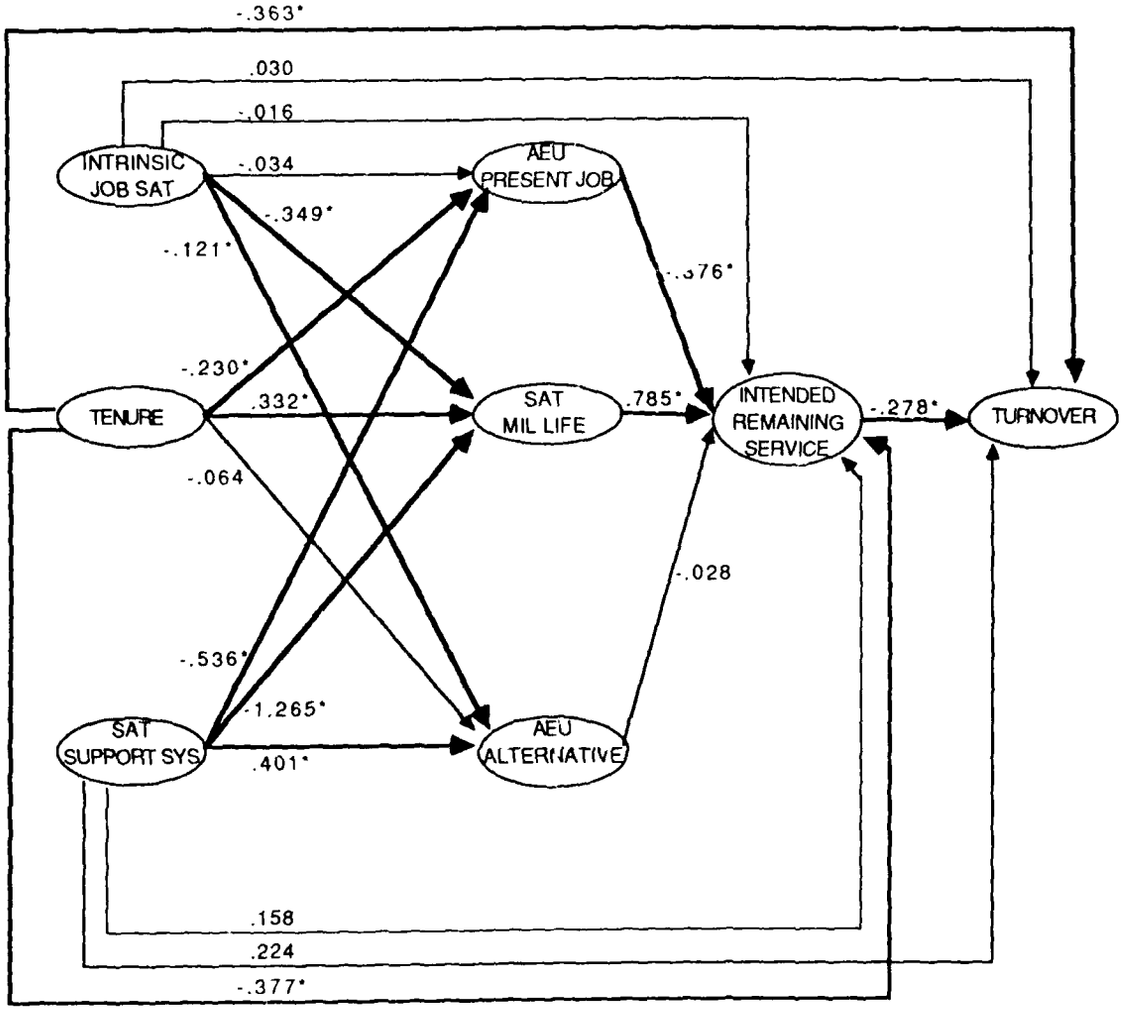
[4]The larger Chi squared is likely a result of the larger sample size of the whole sample.



* = Significant

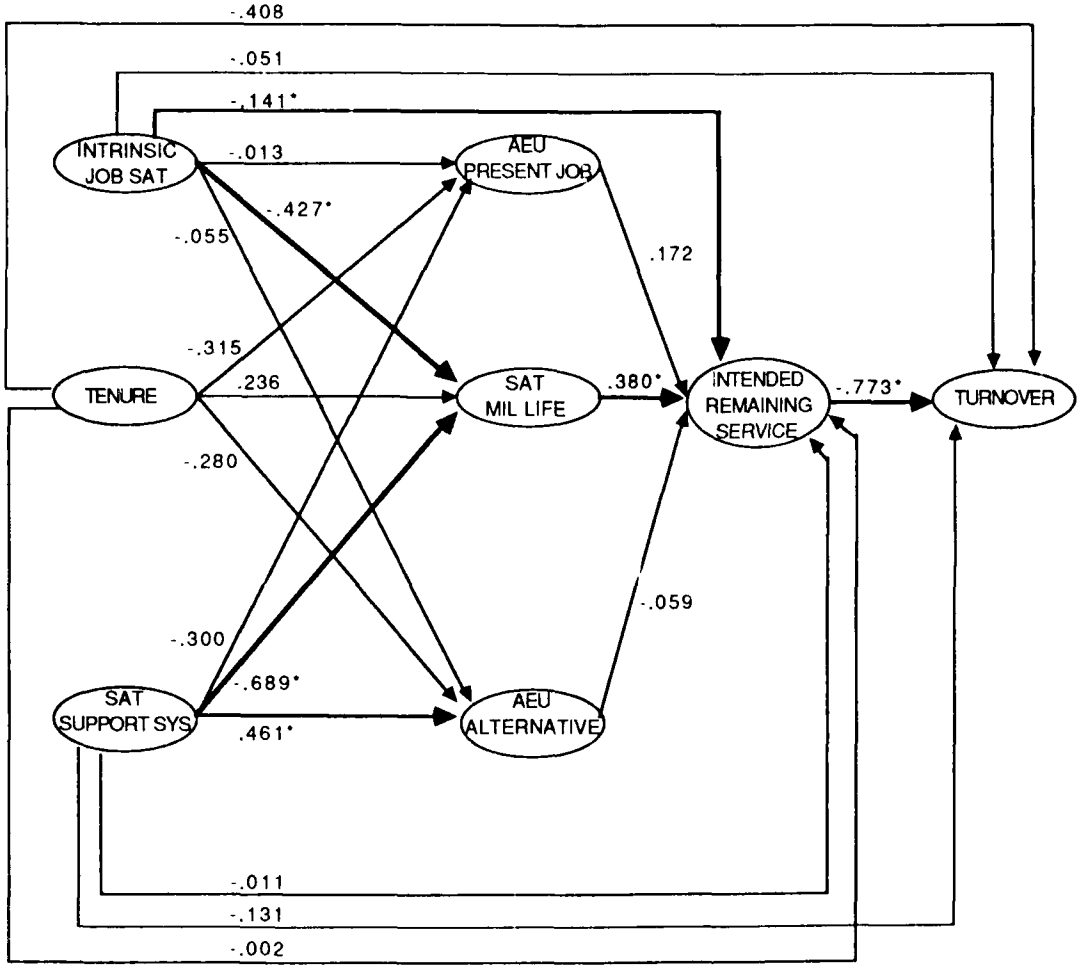
Figure 5. Path Diagram Showing Estimated Parameters: Married Group, N = 939, Turnover = 108

this was the case. An alternative explanation lies in the poor quality of the observed variables for attraction-expected utility of present job, which was discussed above.

5. Model 3, Single Subgroup

The model for the single group is shown in Figure 6. After the initial estimation problems were sorted out, the fit of the single model was quite good. This is surprising, as it was expected that some of the variables chosen were not particularly appropriate for this group. Tenure, for example, was shown to be a very strong influence in the married group. The single group is, however, predominantly young, with only short periods of service, so tenure should have reduced relevance. On the other hand, the relatively short service of this group probably resolved some of the difficulties with the confounding of intended remaining service. The latter variable is probably a better measure of intention, for this group. Similarly satisfaction with support systems was thought to have little relevance to this group, as these systems are primarily aimed at family members.

These doubts about the appropriateness of the predictor variables were partly borne out by the paths that characterize the model. Tenure did not have significant links with any other variable, though the path from tenure



* = Significant

Figure 6. Path Diagram Showing Estimated Parameters: Single Group, N = 324, Turnover = 77

to turnover approached significance ($t = -1.989$).[5] On the other hand satisfaction with support systems contributed both to attraction expected utility of alternatives and satisfaction with military life, indicating that support systems are felt to be important by single officers. The assumption that they would be irrelevant to single officers was apparently incorrect.

The path system in the single model was quite different from and much simpler than, that of either the whole or the married models. These differences between the models point up an important weakness in the modelling research conducted to date. That is, general models of turnover may not be suitable across groups with different characteristics. Marital status has been shown here to have a notable effect on the fit of the model. Other characteristics such as gender, social class, job category, and many others, may have just as strong an effect. Research into the correlates of turnover has demonstrated the likelihood of just such an effect. For example Cotton and Tuttle [Ref. 4], reported that turnover was less reliably tied to satisfaction with pay for blue collar workers than white collar workers. They also reported that gender effects on turnover are less reliable among non- managerial and

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[5]Given the previous comments about significance levels it is not really appropriate to discount this path.

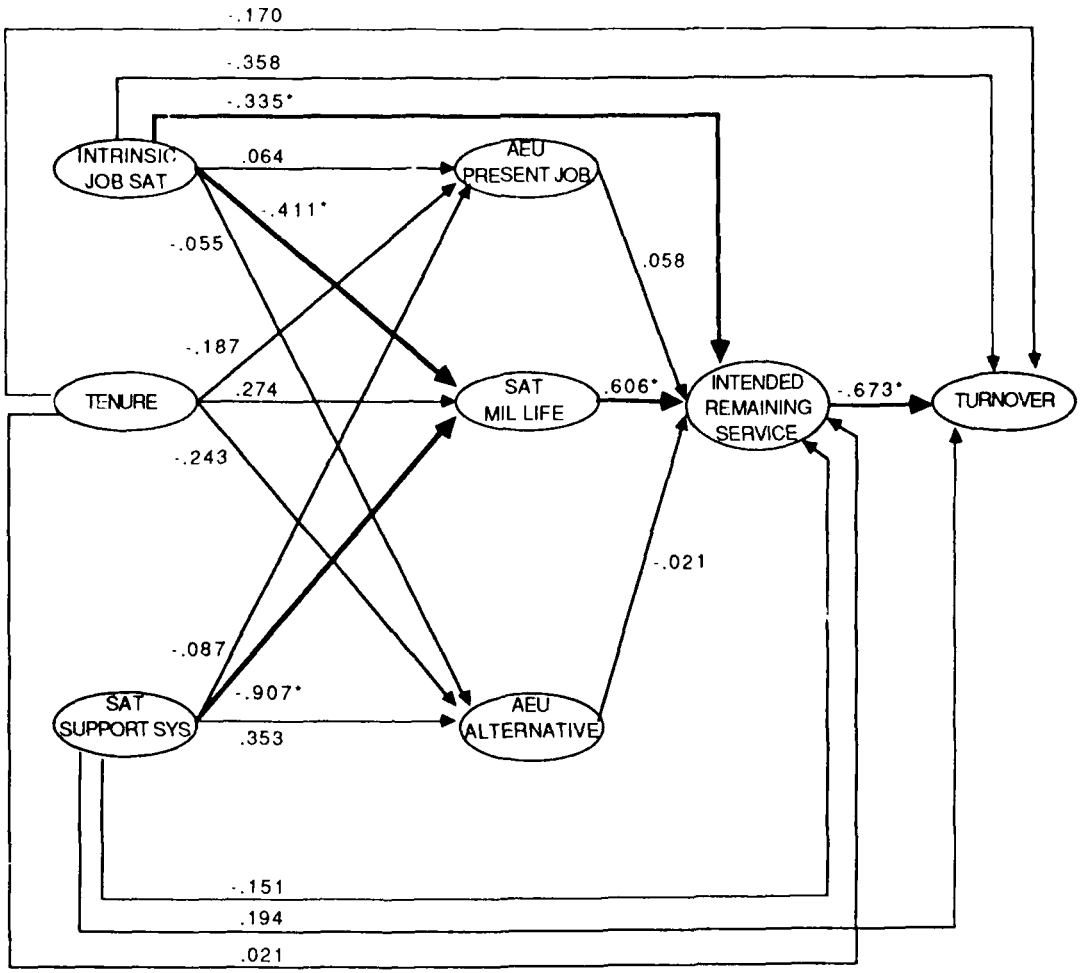
non-professional groups. This point will be brought up again later, after the avenue of entry groups are discussed.

6. Model 3, Academy Subgroup

The model for the Academy entrants is shown in Figure 7. Again, though Chi squared was smaller for this group, the fit of the model, as measured by GFI and AGFI, was not as good as for the whole sample. Nevertheless the fit was moderately good. There were some major differences between the significant paths in this model and the whole sample. There were far fewer significant paths between the Ksi and Eta constructs. Tenure was not linked to satisfaction with military life (though this path approached significance; t = 1.996). The only other paths were from satisfaction with support systems to satisfaction with military life and from intrinsic job satisfaction to satisfaction with military life and intended remaining service. For this group there were no direct effects on turnover from any of the Ksi constructs. All of the effects went through either satisfaction with military life or intended remaining service.

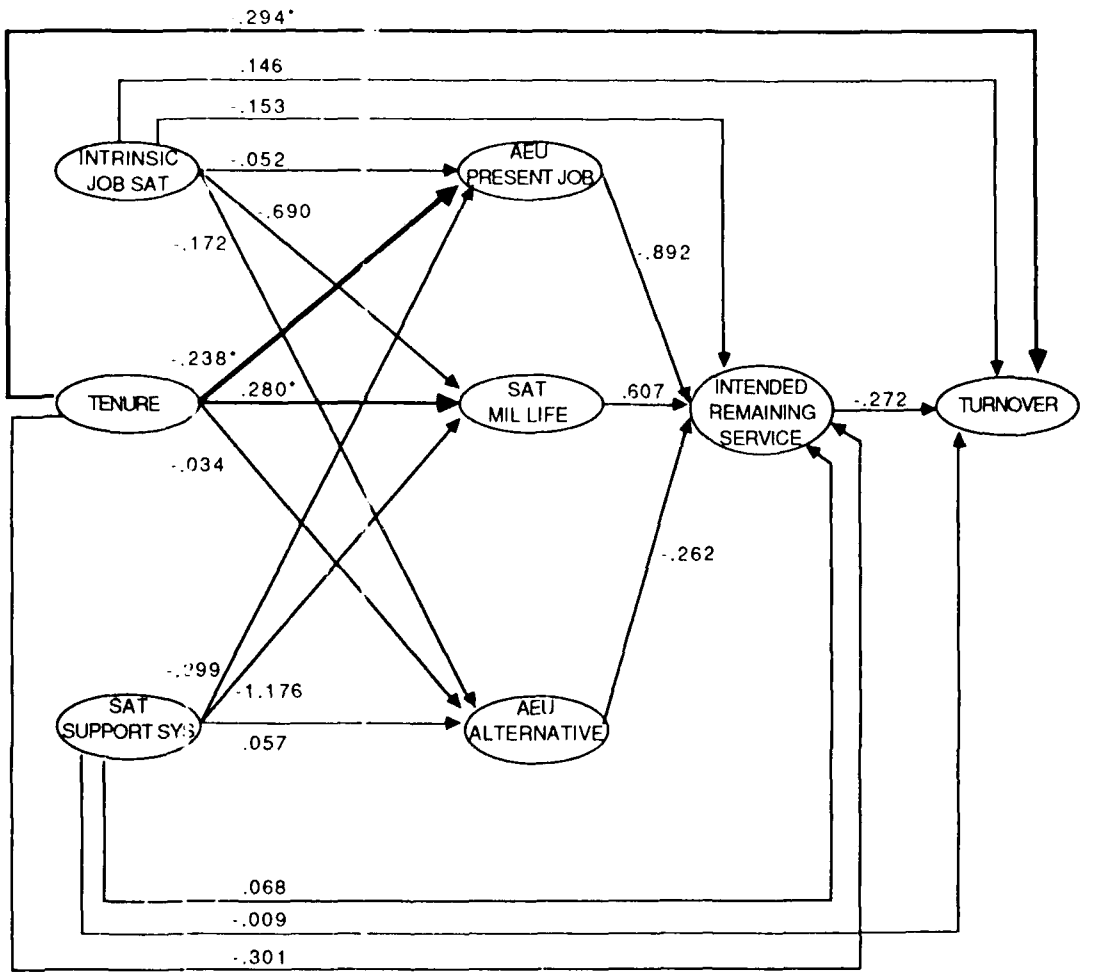
7. Model 3, OCS/OTE Subgroup

The model for the group which entered through OCS/OTE is shown in Figure 8. GFI and AGFI indicate that the fit was not quite as good as for the whole sample, but was still moderately good. Chi squared for this model was



* = Significant

Figure 7. Path Diagram Showing Estimated Parameters: Academy Group, N = 222, Turnover = 23



* = Significant

Figure 8. Path Diagram Showing Estimated Parameters: OCS/OTE, Group, N = 114, Turnover = 22

the smallest and had the largest p value of all the runs.[6] The only significant path to turnover in the model was directly from tenure. The expected path, through satisfaction with military life and intended remaining service, was not significant. Strangely there were no significant paths, to other variables, from either intrinsic job satisfaction or satisfaction with support systems. The absence of effect from intrinsic job satisfaction is particularly difficult to explain, given its well documented relationships in previous research and the fact that it is a significant contributor in all other models (with the exception of the no obligation group, yet to be discussed). It is possible that the t values have been sufficiently affected by the fit of the model, to disguise their real relationship. No other explanation comes to mind.

8. Model 3, ROTC(R) Subgroup

The model for the ROTC(R) group is shown in Figure 9. The fit of the model for this group was very poor and the parameter estimates shown in the figure are likely to be unreliable. The results were characterized by larger than previous parameter estimates and standard errors. There is also an unexpected sign (though the path is not significant) between satisfaction with military life and intended

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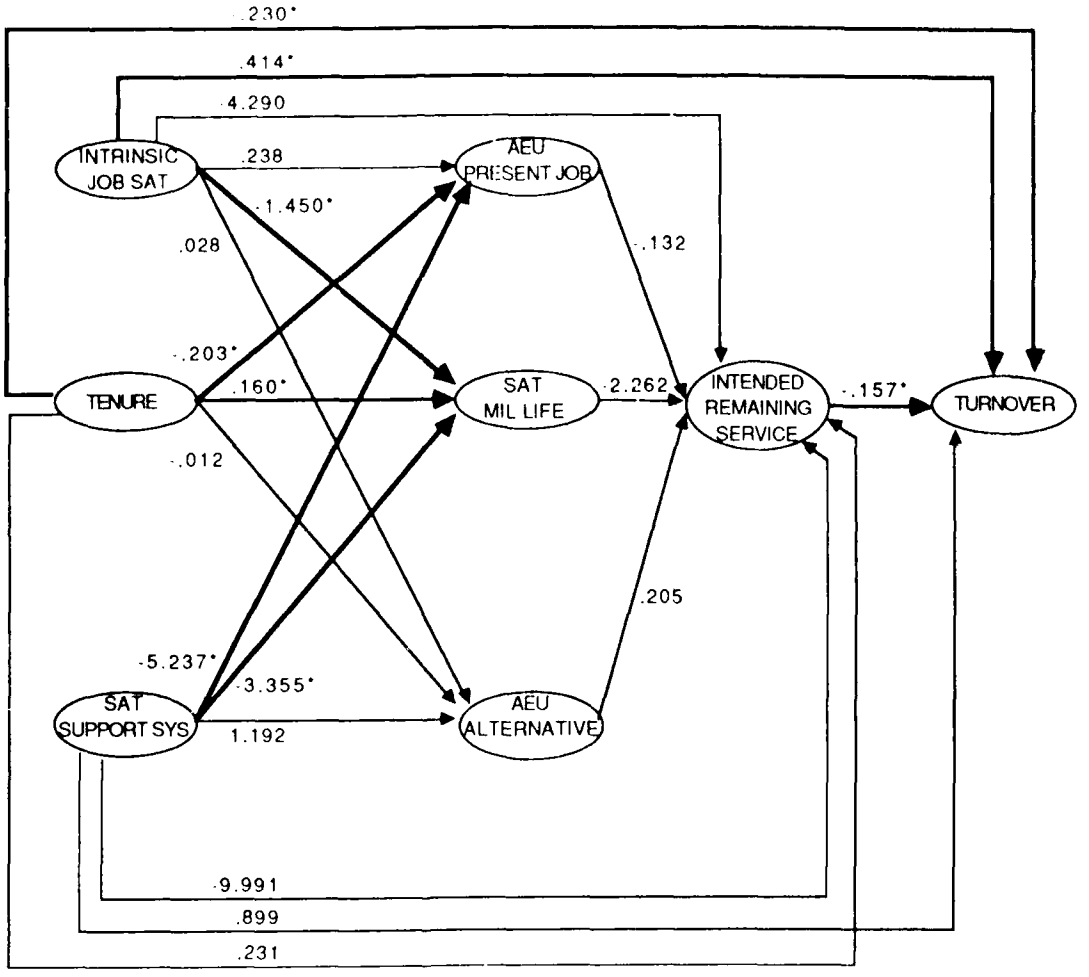
[6]The small Chi squared for this small sample model relative to the large Chi squareds obtained for other runs, is indicative of the effect sample size can have on the inflation of Chi squared and its probability value.



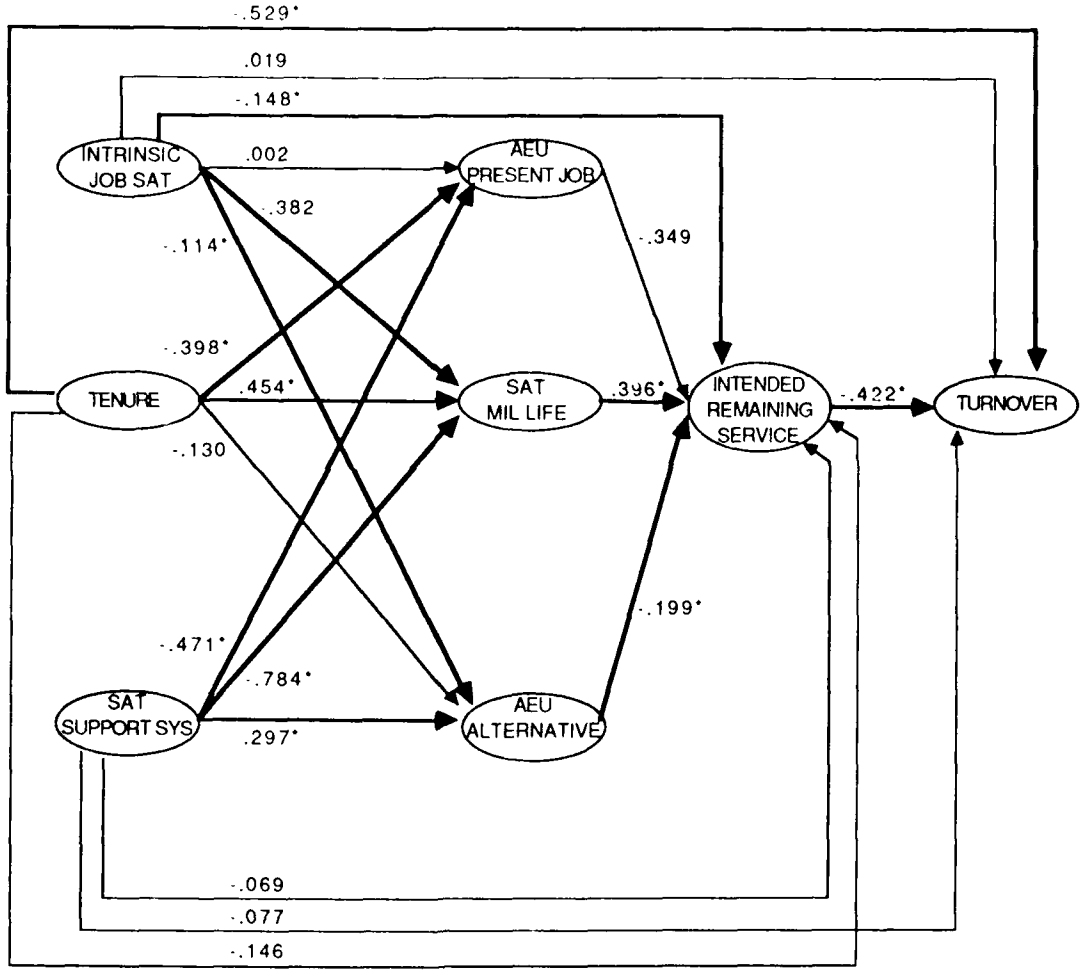
* = Significant

Figure 9. Path Diagram Showing Estimated Parameters: ROTC(R) Group, N = 496, Turnover = 63

remaining service. The results of this run should therefore be discounted. This failure of the model in this case is not easy to explain. The ROTC(R) group makes up a significant proportion of the sample. ROTC(R) has 433 individuals in it, with 63 having left the service. The percentage married in the group is 78 percent, compared with 74 percent for the whole sample. The distribution on the length of service variable indicates that it is similar to the whole sample. These two variables are therefore unlikely to be the cause of the poor fit.

9. Model 3, ROTC(S) Subgroup

Figure 10 shows the estimated path parameters for the ROTC(S) group. Unlike the ROTC(R) group, the fit of the model to the ROTC(S) group was moderate. The path pattern was quite similar to that of the whole sample, except that there was not a significant path from tenure to intended remaining service but a path between attraction expected utility of alternatives and intended remaining service, was evident. The path between intended remaining service and turnover was also present. The differences between this group and the ROTC(R) group are very difficult to explain. Out of all the method of entry groups, these two were expected to be the most similar, having undergone the most similar induction processes. Why the model should fit one group so poorly and the other moderately well is a mystery.



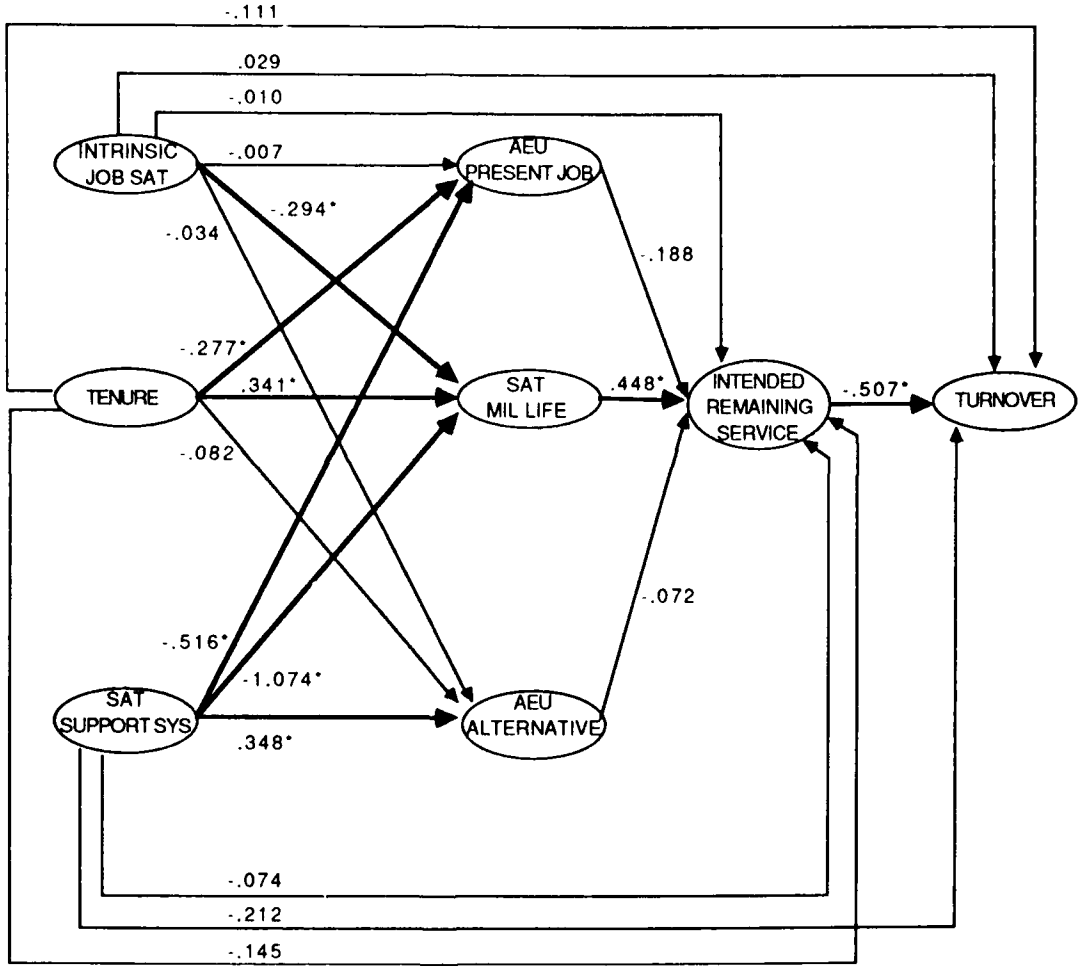
* = Significant

Figure 10. Path Diagram Showing Estimated Parameters: ROTC(S) Group, N = 430, Turnover = 77

B. LENGTH OF TURNOVER PERIOD

The model for the reduced turnover period (up to September 1985; i.e., approximately nine months after the survey was distributed) is shown in Figure 11. The goodness of fit of the model, as indicated by the Q plot, was moderate. There are some interesting differences between this model and its counterpart for the whole period considered (some 30 months after the survey was distributed). In the reduced turnover period model, the path between intended remaining service and turnover is significant and is the only path to turnover. This is much more consistent with the predictions made by the Mobley, Griffeth, Hand and Meglino model. Despite this, the goodness of fit, as indicated by Chi squared, GFI, and AGFI, is better for the longer period. It would seem that the same variables can be used to predict turnover, both in the short and longer term, but that the paths from the predictors will be different between the periods.

Dalessio, Silverman and Schuck [Ref. 10], commented that one reason that coefficients have shown considerable differences between reported research, is that the turnover period differs from author to author. The differences in the path coefficients between the reduced turnover period and the whole period, corroborate their conclusion. The



* = Significant

Figure 11. Path Diagram Showing Estimated Parameters: Whole Samples, Turnover to December 1985, N = 1263, Turnover = 65

pattern of the differences between the estimated parameters of the two groups is quite interesting. For most of the antecedent variables to turnover, the parameter is larger for the longer turnover period. The exceptions are the paths from satisfaction with support systems and intended remaining service to turnover. In these cases the parameters for the shorter turnover period are larger. That intention should have a relatively stronger affect on turnover, in the short term as compared to the long term, seems intuitively correct and is in agreement with both the predictions of the Mobley, Griffeth, Hand and Meglino model and with the conclusions of Steel and Ovalle [Ref. 11], discussed in the literature review. Why satisfaction with support systems should show the same relationship, when other affective variables do not, is not so obvious. Perhaps officers are more likely to react to conditions which affect their families in the short term.

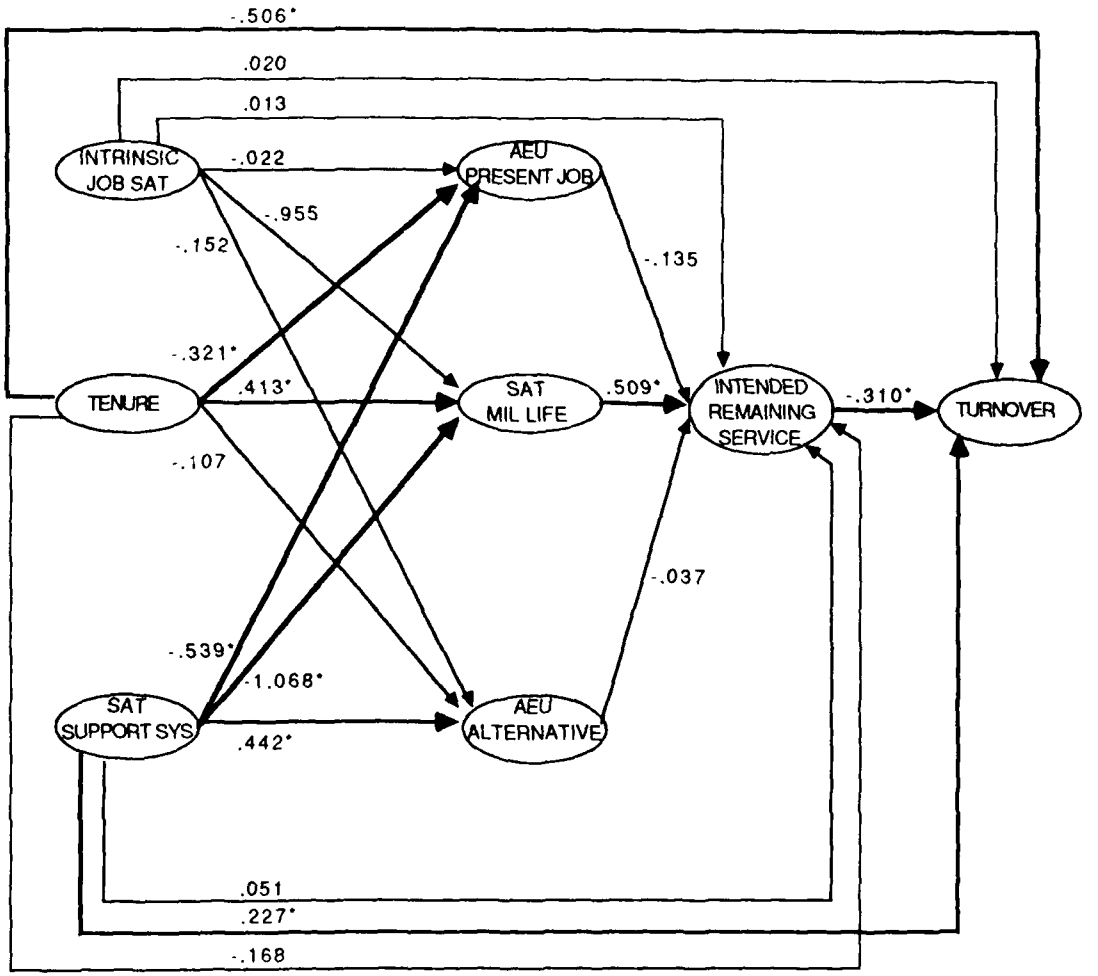
C. EFFECT OF INITIAL OBLIGATION

The fit of the model for the group unconstrained by an initial obligation, was not as good as the fit for the whole sample. This was surprising as it was expected that the fit would improve. Part of the reason for this may lie in the construction of the intended remaining service variable. In effect it takes account of service obligations to some degree, because respondents would have taken obligations

into account when answering the intended length of service question.

The path diagram for the unconstrained group is shown in Figure 12. The removal of those whose initial obligation would prevent them from leaving during the turnover period had a distinct effect on the path system. The link between intended remaining service and turnover was now significant. This seems to indicate that initial obligations can have a confounding effect and should be controlled for in the development of models of turnover. A direct path from satisfaction with support systems, to turnover, was evident and the path from tenure to turnover was still present. As with the OCS/OTE model, intrinsic job satisfaction has no significant paths to any other variables. It is possible that the fit of the model has sufficiently biased the t estimates to disguise the effect. No other explanation could be thought of.

Overall it would seem that initial obligation does have an affect on the relationships between the variables. When initial obligation is controlled for, the path system through the model becomes much simpler and, in general, fits the Mobley, Griffeth, Hand and Meglino model better. This research did not take into account any obligation other than initial obligation and it may be more instructive to do so in future projects.



* = Significant

Figure 12. Path Diagram Showing Estimated Parameters: Initial Obligation Expired, N = 1162

D. GROUP DIFFERENCES

Each of the subgroups, when separated from the sample, exhibited markedly different characteristics in the paths through the model and, to a lesser extent, the size of the parameter estimates. The married group was most similar to the whole sample, and this is not too surprising as they constituted 73 percent of it. The ROTC(S) group also displayed some similarities to the whole sample. On the other hand the ROTC(R) group did not fit the model well at all. For those groups for which the model did fit the data, different path systems were evident. For the whole sample and the OCS/OTE group, the only path to turnover was from tenure. For the married and ROTC(S) groups, there was a path from tenure but also a path through intended remaining service. The Academy group only had a path through intended remaining service. The whole sample and married and ROTC(S) groups had quite similar path patterns between the antecedents of intended remaining service. The OCS/OTE and Academy groups had path patterns that were markedly different, both from each other and from the whole sample and married and ROTC(S) groups.

Because the questionable significance levels may have been giving a distorted impression of group differences in the paths through the model, it was decided to examine the path coefficients without regard to their indicated significance. A comparison of the parameter estimates shows

that there are some similarities between the models. Table 19 shows the parameter estimates for the major paths through the model for each of the groups. The paths through the attraction expected utility constructs have not been included, because these were not, in general, important. The ROTC(R) group has also been omitted because of its poor fit and the consequent unreliability of the estimates.

Although there are some quite large differences between some of the parameter estimates, across the different groups, there is also some degree of consistency. This is particularly true of the signs of the parameters. Most of the differences in sign occur when the estimates are close to zero and so can be discounted. The main exceptions to this are the paths between intrinsic job satisfaction and turnover in the Academy group and satisfaction with support systems and turnover in the December 1985 turnover group.

As discussed in the literature review, Dalessio, Silverman and Schuck [Ref. 10] suggest a possible reason for the differing path coefficients, between models. Single models of turnover might not be appropriate for different groups. Some support for this suggestion is provided by the path patterns demonstrated here. It certainly seems clear from these results that variables which provide reasonable fit for one sub-group, do not for others. In the case of the single group this might be easily explained away in terms of the suitability of the variables used as

TABLE 19

PARAMETER ESTIMATES FOR THE MAJOR PATHS THROUGH THE MODEL, FOR EACH GROUP WITH AT LEAST MODERATE FIT

To Satisfaction with Military Life
From

Group	Intrinsic Job Satisfaction	Tenure	Sat Support Systems
Whole	-.376	.402	-1.092
Married	-.349	.332	-1.265
Single	-.427	.2 6	.689
Academy	-.411	.274	- .907
OCS/OTE	-.690	.280	-1.176
ROTC(S)	-.382	.454	- .784
Dec. 85	-.294	.341	-1.074
No Oblig'n	-.955	.413	-1.068

To Intended Remaining Service
From

Group	Intrinsic Job Satisfaction	Tenure	Sat Support Systems	Sat Mil Life
Whole	-.123	-.210	.008	.482
Married	-.016	-.377	.158	.785
Single	-.141	-.002	-.011	.380
Academy	-.335	.021	-.151	.606
OCS/OTE	-.153	-.294	.068	.607
ROTC(S)	-.148	-.146	-.069	.396
Dec. 85	-.010	-.145	-.074	.448
No Oblig'n	.013	-.168	.051	.509

To Turnover
From

Group	Intrinsic Job Satisfaction	Tenure	Sat Support Systems	Intended Service
Whole	.044	-.464	.174	-.309
Married	.030	-.363	.224	-.278
Single	-.051	-.408	-.131	-.773
Academy	-.358	-.170	.194	-.673
OCS/OTE	.146	-.294	-.009	-.272
ROTC(S)	.019	-.529	-.077	-.422
Dec. 85	.029	-.111	-.212	-.507
No Oblig'n.	020	-.506	.227	-.310

predictors. This is certainly not the case with the ROTC(R) group. If such large differences as these can occur in a group that is as relatively homogenous as junior, Army officers, there seems little hope of formulating models that will be effective across industries, social class, racial lines, or any number of other social divisions.

As has been mentioned, one other possible reason for the mixed results obtained, relates to the use of tenure as a predictor of turnover, when in fact its true effect is as a moderator variable. Guion and Gibson [Ref. 40] point to recent developments in the use of moderators for improving prediction in personnel selection. Past studies, using OLS regression, have underrated the effect of moderators because correlations between the principal predictor and the moderator frequently exist. This collinearity affects the interaction term, weakening the moderator effect. Similar considerations may be relevant for the testing of turnover models, whether using OLS or structural equation modelling.

A further point arises from the diversity of paths to turnover through the model. Intention to quit is frequently used as a proxy for turnover in the testing or development of models. Although the variable used here differs in some respects from intention to quit, it proved not to be universally included in the path to turnover. The implications of these findings is that intention to quit may

not be suitable as a proxy, as a path to turnover may not exist through it.

E. PREDICTIVE POWER OF THE MODEL

The coefficients derived from the probit regression indicate that the model has some problems. There are two unexpected signs, on the variables probability of finding a good civilian job and satisfaction with co-workers. This is suggestive of multicollinearity in the data. One possible source is the relationship between length of service and intended remaining service that has already been discussed. However an examination of the simple correlation matrix revealed a correlation of only -.0430. Other possible sources, revealed by the simple correlation matrix, were intended remaining service and satisfaction with military life (.3799), and expectations re pay and allowances and expectations re retirement benefits (.3247).

As expected, due to the low rate of turnover (15 percent over the whole period), the model was not able to predict as accurately as the case if it was assumed that no-one would leave. Using the model the error rate would be 21 percent, whereas the 100 percent retention assumption would have an error rate of only 15 percent. Nevertheless, the predictive power of the model was considered to be reasonably good, especially when taking into consideration the drastic variable reduction that occurred, in order to get the model to run. In any case, predictive power is not the only

criterion on which turnover models should be judged. An equally important characteristic of models is that they aid in the understanding of the psychological process that leads to turnover behavior.

VI. IMPLICATIONS AND RECOMMENDATIONS

This thesis sought to make a test of a theoretical model of turnover behavior, using data that was not specifically generated for the purpose, as is usually the case with such model testing. As such it has had mixed results. On one hand a considerable number of problems, which limited the scope of the study, were encountered. On the other, despite the limitations of the study, some interesting and valuable results, which answered some questions left open in the research on turnover, were obtained.

A variety of procedural and data-suitability problems were encountered during the study. Some of these have simple solutions and leave open the way for fuller test of the Mobley, Griffeth, Hand and Meglino model of turnover, using data that are already available.

Many of the data problems encountered in this study, resulted from limitations imposed by the analytic technique employed. LISREL V was the only causal modelling program available on the NPS mainframe and its restrictions had to be accepted, if it was to be employed. Many variables were eliminated because of their categorical nature or because their distribution made them unsuitable. There are however programs available that would not impose such severe restrictions and might enable a fuller test of the model.

It is recommended that a program, such as LISCOMP, which can handle categorical variables, be obtained for future research in this area.

Another data restriction resulted from the small percentage of turnover in the data set chosen. Officer turnover was selected because of a particular interest of the researcher in that area. In terms of a test of the Mobley, Griffeth, Hand and Meglino model, a data set in which the criterion was better represented would have proved less restrictive. The 1985 DoD Survey is a rich source of such data. It is recommended that a follow up study be conducted, using a data set of enlisted men, who turn over at a much more rapid rate and who are represented in greater numbers.

This study concluded that it is possible that tenure would be better treated as a moderator variable, rather than an exogenous one. It was not possible to further test this finding in this study, due to the small representation of turnover behavior. A test of the model, using an enlisted data set, would enable further investigation of this finding. It is recommended that a study be instituted, using an enlisted sample, with length of service sub-groups. This would have the added benefit of removing the covariance between length of service and intended remaining service, which proved to be a problem in this study. Alternatively, the enlisted data sets have other measure of intention which

could be employed, again avoiding covariance problems and the likelihood that the relationship between tenure and intention is curvilinear.

A second possibility for the relationship of tenure, with other variables is that the effect is not one way, but that feedback loops exist. In particular, it is possible that tenure and satisfaction with military life could be linked in this way. Those that are more satisfied would tend to self select and stay longer. This possibility should be investigated.

A further advantage of the enlisted data sets, is that service obligations are better accounted for and could be controlled in any future test of the model. This study concluded that obligations do have a confounding effect on the model and should be controlled for in any future study.

The contribution of satisfaction with support systems to the model, suggests that family considerations are important in the turnover decision. It is recommended that future research incorporate a number of measures of family disruption into the model. These are available, both in the members survey and its companion survey of military spouses.

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